Machine Shop

RIGHT DOWN TO THE SMALLEST SIZE

Every

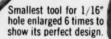
BOKUM BORING TOOL

——conforms to a uniform design and quality that characterizes the Bokum line. Every Bokum tool is made to a design based on a mathematical formula that assures precision performance for the entire life of tool. The unique helical form remains constant throughout repeated resharpenings.

Available in high speed steel (Cat. No. 1 139-6) carbide-tipped (Cat. No. 398-6) and solid carbide (Cat. No. 948). Write to Dept. B for Catalog.



For fast and convenient resharpening of Bokum Tools, refer to Cat. No. 949.





STY bott

for bottoming



for internal threading

BOKUM TOOL COMPANY

14775 Wildemere Ave. Detroit 38, Michigan



Look, Daddy - a steam engine!

THAT'S right. Kind of a rare sight these days.
Looks like the good old "iron horse" is headed
for the last round-up.

Why? Competition mostly. Something better came along. Locomotives that were more efficient—less costly to operate and maintain. That's the way it goes. Competition means progress for some things, obsolescence for others.

Naturally you want your product to be a success in the competitive days ahead. So you're probably looking right now for new ways to improve quality and cut production costs. That's where we here at Heald may be able to help. New Heald developments in automation, battery-type equipment, way-type and transfer-type Bore-Matics, plus a number of advanced design features, can now be applied

to a wide variety of jobs. We'd like to show you what a fresh Heald viewpoint and latest Heald equipment can do—on long or short runs, single or multi-purpose setups.

Competition is wonderful when you're ahead of it. Our business is to keep you there. That's why IT PAYS TO COME TO HEALD.



THE HEALD MACHINE COMPANY WORCESTER 4, MASSACHUSETTS

Offices in Chicago • Cleveland • Dayton
Detroit • Indianapolis • New York

Internal and Rotary Surface Grinding Machines and Bore-Matics

publisher

M. L. Forney

editor

Fred W. Vogel

editor emeritus

Howard Campbell

 $associate\ editor$

Robert I. Shore assistant editor

R. L. Griesinger

contributing editor Gilbert C. Close

VOLUME 26

MODERN

contents

Machine Shop

NUMBER 12 . MAY, 1954

Over the Editor's Desk	
Features in This Issue	119
Selection and Heat Treatment of Tool and Die Steels, Part I	120

Shipping is Important, Too By K. R. Benfield	128
Quality Control in the Small Shop	136

By C. W. Kennedy	. 130
Machining Stainless Steel—Case History No. 15	. 144

I-Tab-Wodi Plan Effects By Harry L. Spooner	Time a	and Material	Savings	150
---------------------------------------------	--------	--------------	---------	-----

Sectional Rack for Bar S	tock Store	ıge	 	 172
By H. G. Frommer				

Two-Position By W. M.	Milling	Fixture	 	 	 	 	 	180
Madam Fa	 - W/	1.						

modern E	luibment	at w	ork				
-Lo-swing	Automatic	Work	Loading	and	Transfer	Equipment	

Applied to Camshaft Job	222
-Precision Tapmaker Employs Unit Dust Collectors for Grinders	226
-Superfinishing Increases Operating Efficiency and Life of Radial Drill.	230

-1 rounction snaving of Two-ocar	Citister	202
-Tungsten Carbide Insert Tool Pro		
Cutting Per Grind		236

—Fast Setup for Drilling Automobile Door Handles	. 240
-Machines Installed Without Using Bolts	. 242

—Continuous	Cycle Bo	oring Set	up for I	tocker Ar	m Produ	action	244
-Adoption of	Precoate	ed Metal	Coil Sav	es Cost of	Paint S	Shop Expansion	246

						 	248
Ideas	froi	m. Rea	aders	 	 	 . 202-	214

Departments

Departments			
News of the Industry	256	"Where to Get It"	416
New Shop Equipment	292	Editorial	426
Services Directory	414	Index to Advertisers	428

Advertising Representatives 221

Published monthly and copyrighted (1954) by

Printed in U. S. A.

Acceptance under Section 34.64, P. L. & R. Authorized Mamana



Gardner Publications, Inc. 431 Main St., Cincinnati 2, Ohio



A LANDIS THREAD ROLLING MACHINE

. . . the LAN-HY-ROL, generating external threads by the chiplescold-forming process, offers important improvements in production economy and thread finish. This machine is being built under an exclusive license agreement with Pee-Wee Maschinen and Apparatebau of Berlin, Germany, manufacturers of the world-famed Pee-Wee Thread Roller.

The new LAN-HY-ROL offers the same outstanding combination of precision, productivity, and flexibility which has made the German Per-Wee Thread Roller unequalled in its field. We will share engineering knowledge and experience with Per-Wee, and jointly conduct an extensive program of research and development. Significant improvements will be incorporated in the LAN-HY-ROL, comparable to those which have inade other LANDIS Equipment outstanding in Thread Cultury, Thread Grinding, and Thread Tapping.

The new LAN-HY-ROL is another forward step at more than 50 years of LANDIS history, during which we have been continuously affering more efficient methods of generating screw threads.

The World's

Largest Manufacturers of Threading Equipment - Cutting - Tapping - Grinding - Rolling



LANDIS Machine Company

NEW 6" CARBIDE GRINDER



BRAKE on each end for handy, quick stopping when reversing.

NO SPRAY-NO SPLASH SWIVEL GUARD closes one side of wheel while other is in use. It is the heart of Hammond's patented No Spray - No Splash feature.

NO SPRAY - NO SPLASH SPOUT aerates and breaks up coolant which flows without force.

NO SPRAY - NO SPLASH PAN catches any excess spray or splash and keeps operator and floor dry.

SAFETY CUP DISC fills the cup of a silicon carbide wheel, preventing tool or hand from entering. An important safety feature — patented.

TABLE SCREW FEED makes table adjustment easy and protects against wheel damage.

TABLE easily tilts to any degree from 30° above to 30° below horizontal and quickly locks with a single lever. Table is surface ground and has a cored selfcleaning slot.

TWO MODELS AVAILABLE - WD-6 Wet or Dry as shown, and D-6 Dry (bench or floor). Is of the same general construction as the Model WD-6 except for the wet equipment.

There are more new and exclusive features on the Hammond Model WD-6 than on any other low-cost wet 6" carbide grinder. It is a full-fledged machine which incorporates the many features of the larger Hammond 10" and 14" Grinders. Compare and you'll find no equal in the low-cost 6" field.

Write for catalog showing America's most complete line of carbide tool grinders and finishers.

"FINEST IN THE LOW PRICE FIELD"

Hammond Machinery Quilders

1615 DOUGLAS AVENUE

HAMMOND

KALAMAZOD

KALAMAZOO, MICHIGAN

New · Fast · Proven

LOW COST methods for PERFORATING and NOTCHING SHEET METALS

Whistler MAGNETIC Dies

at work in large inclinable press. Magnetized retainers hold the units. No bolting required. A fast, economical method in making up a punch and die set for short or long runs. All parts re-usable.

Whistler ADJUSTABLE Dies

on perforating and notching job, using Tee slotted die set. With Whistler Adjustable Punch and Die units production starts within hours instead of weeks. Last minute job changes made quickly.

REDUCE DIE COSTS

All units and parts are interchangeable and used repeatedly in different arrangements. INCREASE PRESS PRODUCTION-Down time is minutes as compared to bours for change-over. For precision work in all types and sizes of presses. START PRODUC-TION AT ONCE. Pierce materials up to 1/4" thick mild steel. Standard sizes and shapes available up to 3 inches. Special sizes to order.







Here are the complete details with prices and application illustrations. Send for these catalogs. No obligation.

NAME		
FIRM		
DDRESS		
TV	ZONE	STATE

WHISTLER & SONS, Inc.

Adjustable, Magnetic, Custom and Cam Dies for all Industry



Farrel speed reducers start out with a better chance in life.

To begin with, the gearing in a Farrel speed reducer has teeth generated by the famous Farrel-Sykes method—a process that assures accuracy of tooth spacing, profile and helix angle. The herringbone design provides evenly distributed pressure over each tooth, from tip to working depth line. This means that there is no

tendency for the teeth to wear unevenly and thus shorten the life of the gears.

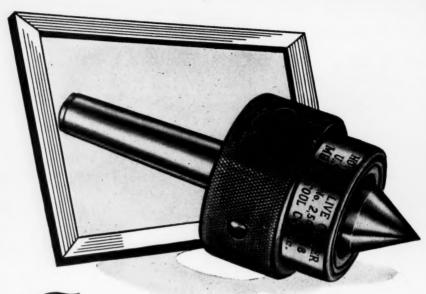
The gears and pinions can be proportioned to meet specific load, speed and service requirements. Input and output shafts can be varied in size, in material and in extension. Housing dimensions can even be changed to meet problems in mounting.

For more about these adaptable units write for a copy of bulletin 449.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Memphis,
Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City,
Tulsa, Houston, New Orlears

FB-923



Finest LIVE CENTER MADE

. HERE'S WHY

- ★ BACK UP RING assures positive rigidity.
- * Bar Expansion Eliminated by means of Thrust Spring.
- * Special alloy tool steel spindles, hardened and ground.
- * Matched precision ball bearings, mounted in tandem.
- * Oil impregnated bronze tail bearing.
- * Points pre-loaded and ground after
- A distinctive oil seal in front of bearings protects them from all foreign matter. Chips, dirt and cutting oil cannot reach the bearings.

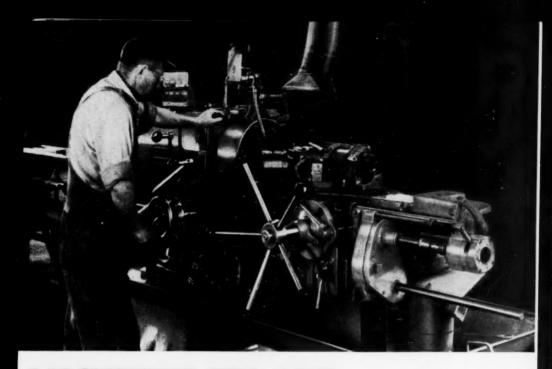
The HOWARD Live Center is the ONLY center that offers the patented BACK UP RING. The Ring maintains solid contact between the quill and head of the center . . . thus greatly increases over-all rigidity.

Send for the new MELIN TOOL Catalog No. 54-C . . . it lists, in addition to specifications and prices on the HOWARD Live Center, the complete MELIN TOOL End Mill Line.



MELIN TOOL COMPANY, INC. 3373 West 140th St.

Cleveland 11, Ohio



MACHINING FOR GOLD at Homestake



with Gisholt Turret Lathes

Yes, gold mining means machinery. And here at the famous Homestake Mine at Lead, South Dakota, Gisholt Turret Lathes help to machine the machines that dig for gold. It's a big job, too—turning out the variety of rock bits and drill rods that are used up in large numbers.

This Gisholt Ram Type Lathe was first used to turn the plain ends on the one-inch quarter-octagon drill steel for two types of rock bits. Production averaged 30 an hour. Now, the machine is also used

to machine and thread three sizes of forged steel drill rods. Besides all this, the Gisholt has the job of facing and chamfering the chuck, or shank ends, of the drill steel so that a perfectly flat face is hit by the drill machine tappet.

Here, again, Gisholt Ram Type Turret Lathes prove their easy change-over and ability to produce profitably, even on small runs—big assets in any machine shop. Ask your nearest Gisholt representative about them. Or write us.

GISHOLTPANY

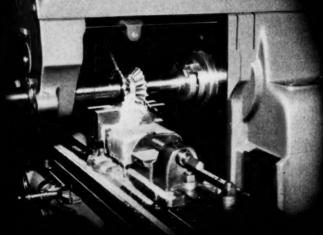
THE, GISHOLT ROUND TABLE

represents the collective experience of specialists in the machining, surface-finishing and halancing of round and partly round parts, Your problems are welco, ned here.

Madison 10, Wisconsin



CINCINN





Cincinnati

Horizontal Milling Machine taking a heavy form milling cut

CINCIN

Are you provoked at slow toolroom milling operations and inaccurate work? Fed up with maintenance bills? You can cure these and other ills of high cost toolroom milling by replacing your old equipment with new CINCINNATIS in the No. 2 range, for example, with Nos. 2ML or 2MI. Reasons why these machines are good medicine for shops Their Dynapoise overarm 500 smooths out the cutting action. Sixteen spindle speeds 25 to 1500 rpm are quickly selected with a single crank type control. Sixteen feeds within the entire range of 120 to 1 ratio are The front of the knee with a similar control. Long life is promoted through automatic lubrication systems, such as the individual reservoir for the vertical screw. Reciprocal and climb milling operations can be handled on machines equipped with automatic backlash eliminator (extra). Control levers are directional and independent, for easier handling. Automatic table cycles available for production setups (extra).

NATI

Other advantages of CINCINNATI Nos. 2ML and 2MI Milling Machines will be found in Sweet's Machine Tool File, and complete data may be obtained by writing for catalog No. M-1662-2.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO

MILLING MACHINES - CUTTER SHARPENING MACHINES - BROACHING MACHINES - METAL FORMING MACHINES - FLAME HARDENING MACHINES - OPTICAL PROJECTION PROFILE GRINDERS - CUTTING FLUID

A Jig Borer And Miller For Jobs Up To 30"X 48"!



- Fulfills every requirement for accurate boring, drilling and vertical milling of large workpieces up to 5000 Lbs.
- Simplified setup, operation and inspection are possible because many parts are easier clamped on a table than mounted on a horizontal machine.
- All controls are in a single movable panel. Operator can control table and spindle from most convenient location without ever changing his position.
- Infinitely variable spindle speeds and feeds. Non-gear, easily maintained direct drives provide unusual smoothness of operation.
- 35" throat capacity—safety controls for machine, job and operator—unusually heavy construction—and a dozen other exclusive fea-

Ask For Brochure

`

W. B. KNIGHT MACHINERY CO. . 3922 WEST PINE BLVD. . ST. LOUIS 8, MO.



As an additional service to you, the outstanding manufacturers above now will deliver die sets with Lamina Guide Bushings and Pins already installed. You simply specify Lamina Guide Bushings and Pins when ordering your die sets . . . there is no delay since complete bushings stocks are on hand at all their plants. For replacement in your present die sets, too, you can now order Lamina Guide Bushings and Pins direct from these same companies.

Complete information on the exclusive seize-free, long wearing, precision-fit features of Lamina Bushings and Pins is contained in our free bulletin and price list. Contact any of the above die set manufacturers or write to us direct for your copy.



OF AN Expert

All the conscientious care and skill which the pride of an expert and years of experience can muster go into a Connecticut "Durakeen" broach. Then the correct cut follows as a natural result . . . even though the broaching machine operator just "operates."

Unless your job is such that you can sacrifice one or two zeros after the precision decimal point, it is folly to buy any but the finest broach. Specify Connecticut "Durakeen" to be sure . . . sure of more cuts per grind, more grinds per broach.

CONNECTICUT

DURAKEEN

BROACHES

DURABILITY

WITH KEENNESS

THE CONNECTICUT BROACH AND MACHINE COMPANY
ACBB3A NEW LONDON, CONNECTICUT



N

REAMERS

Hand
Jobbers
Carbide
Expansion
Center
Shell
Rose Chucking
Chucking
Taper Pin
Helical Flute
Finishing
Roughing
Bridge & Boiler
Stub Screw
Machine

TWIST DRILLS

END MILLS

HOBS

MILLING CUTTERS

GEAR CUTTERS

METAL SLITTING SAWS

COUNTERSINKS

COUNTERBORES

CARBIDE TOOLS

UNION TWIST DRILL COMPANY . ATHOL, MASSACHUSETTS

End Mills Milling Cutters Gear Cutters Twist Drills Hobs Reamers Carbide Tools

OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIVISION, Mansfield, Mass. BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

CUT INVENTORY COSTS, ORDER FROM YOUR LOCAL DISTRIBUTOR

GARBIDE TOOLS INDUSTRIAL TOOLS FOR INDUSTRIAL USERS

They're Precision Machine Ground-From-The-Solid

Consistent Excellent Performance - Unusual Economy and Ultra Precision work has firmly established Jarvis Solid Tungsten Carbide Tools among users who know quality.

Make it a point today to write for our completely new 28 page illustrated catalog and the name of the Jarvis representative nearest you.

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT



EASIER-FASTER-MORE ECONOMICAL

Grinding, Cutting, Buffing or Rotary Filing

Whether your operations call for GRIND-ING, CUTTING, BUFFING, SANDING or ROTARY FILING, Jarvis Flexible Shaft Machines are available in BENCH, FLOOR or OVERHEAD Types - in Single or Multiple Speeds to suit your Individual Requirements.

A Jarvis Factory Trained Representative will be pleased to assist you in selecting models best suited to your use. Complete catalog upon request.















FLEXIBLE SHAFT





THE CHARLES L. JARVIS COMPANY, MIDDLETOWN IN CONNECTICUT

Versatile LeBlond Lathes Knock Down







In Norfolk, Va. versatile LeBlond 19° Regal Gap Lathe recuts welded boot scraper shaft. Exacting precision is number one requirement here. Note removable bed section is in place on this job, can be removed to accommodate work up to 271/4" diameter. Ask for Bulletin R-PG-1-A.



In Ft. Dodge, Iowa, LeBiond 17" Regal Lathe bores sprocket to ±.001". Sprocket must fit bearing shaft also turned on the LeBiond. Plant Engineer, John F. Hoertz, says. "This lathe holds tolerances better than previous lathes, saves tool life, speeds up maintenance work . . .". Ask for Bulletin R-135-A.



In Greenville, Miss., LeBlond 16" Heavy Duty Engine Lathe dresses down shart for flume return pump, part of the water return system at U.S.G.'s Pressed Board Plant. Other jobs include machining precision bearings for Pelton pump, turning down built-up bushing on universal joint for a steam press—typical of the great variety of turning work now done in U.S.G.'s own shops. Many used to be jobbed out—cost extra time and money. Ask for Bulletin HD.195.A.

"Upkeep" Costs for U.S. Gypsum

16 U.S.G. Plants from Maine to California

depend on LeBlonds for speedy, economical maintenance.

Dozens of turning jobs that used to be "farmed out" by U.S. Gypsum Plants now get done at less cost and days sooner, right in U.S.G.'s own maintenance shops—thanks to versatile LeBlond Lathes.

With U.S.G.'s quarry-to-finished-product operation, plant machinery ranges from huge mining equipment—to processing machinery—to speedy conveyors—to intricate packaging machines that bundle up finished products. Who knows what the LeBlond's next "fix-it" turning job will be? Today it's dressing down the shaft of a flume return pump. Tomorrow it's finishing a precision bearing where the critical tolerance goes down to tenths!

Convenience, low cost, dependability, wide variety of work—that's what LeBlond Lathes mean to maintenance men at U.S. Gypsum. And that's why there's at least one LeBlond Lathe on maintenance work in each of 16 U.S.G. Plants—from Maine to California.

How many of your turning jobs did you send out of your plant this month? Is the "other fellow's" profit a large chunk of your maintenance cost?

Call your nearby LeBlond Distributor. Show him the variety of turning work that your maintenance requires. Tell him how long it takes to get it done elsewhere, what it costs. From LeBlond's complete line of 76 different lathe models, he can recommend lathes that will handle all of it—or at least a major portion. You'll get the work done sooner, dependably, and without an outsider's profit to pay for.

For complete information contact your LeBlond distributor or write-

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO



In Alabaster, Mich., LeBlond 24" Regal Lathe threads take-up bolt for 41/2 yard Bucyrus-Erie Rock Shovel. Four threads per inch, speed 95 rpm. Plant Engineer, E. John Minderman, says this LeBlond Lathe handles work ranging "from very small parts found in electrical and hydraulic equipment to large gears, shafts and armatures that require the full capacity of the machine". Reports "very dependable service". Ask for Bulletin R. 163-A.



In Plaster City, Calif., U.S.G. saves at least <u>seven</u> days by machining this rolled on the LeBlond 20° Standard Duty Engine Lathe—right in their own shop. Job used to be sent out, took up to ten days to complete. Another LeBlond Lathe is still in regular use at the Plaster City Plant, after over 25 years of maintenance work. Plant Engineer, R. W. Langewisch, says LeBlond Lathes "save time, expense, increase thop capacity". Ask for Bulletin SD-250-A.



World's largest builder of a Complete Line of Lathes for More than 66 Years.



NOW! New Jacobs Model 96 Rubber-Flex Collet Chuck

brings famous grip to whole new group of applications

Grinders! Milling machines! Jig borers! Jig grinders! Lathes! Various types of special machinery where precise compact collet closure is vital!

ALL get the benefit of the famous Jacobs Rubber-Flex Collet grip in the new Jacobs Model 96 Collet Chuck.

The long, steel jaws of this collet - locked together with oil-resistant synthetic rubber an absolutely parallel grip over the entire bearing

What's more, each collet has a full 1/8" range so that the standard set of eleven Rubber-Flex Collets cover the gripping range of eighty-eight split steel collets! A geared key tightening device and selftightening toggle action of the collet jaws give the chuck gripping power far beyond that obtained with split steel collets. Chucks any diameter bar between 1/6" and 1%".

For work holding: Model 96 Collet Chuck permits precision chucking of bright finished bars, with close or wide tolerance diameters, resilient or compressible materials, tubing and brittle materials such as ceramics or glass.

For tool holding: Model 96 Collet Chuck can be used for drilling and reaming on jig borers and other high precision machines, holding proving bars and indicators. Extreme accuracy and wide capacity range make it ideal for tool and cutter grinding on cylindrical and cutter grinders.

TWO MODELS: Model 96-05, \$135.00; Model 96-F1, \$150.00. Rubber-Flex Collets, \$12.00 each.

For further details, ask your Industrial Supply Distributor for Catalog 54-CC. The Jacobs Manufacturing Company, West Hartford 10, Conn.

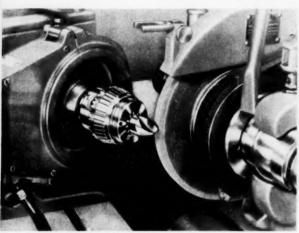




PRECISION REAMING ON JIG BORER with Model 96-05.



NEW JACOBS MODEL 96-F1 COLLET CHUCK on magnetic chuck holds work for surface grinder.



MODEL 96-05 ADAPTED TO HEADSTOCK OF CYLINDRICAL GRINDER.



NEW CHUCK Model 96-F1 here holds work on jig grinder,



PRECISION BUSHING GRINDING with Model 96-05.



CHUCKING WORK ON VERTICAL MILLING MACHINE with Model 96-F1.

IF IT'S A

JACOBS

IT HOLDS

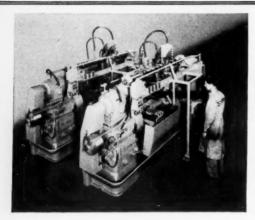
Jacobs and your local distributor

are ready to deliver the chucks you need and the service you deserve.

- ... first in chucks
- ... first in service

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK



So-swing AUTOMATIC
WORK LOADING AND TRANSFER
EQUIPMENT CUTS CAMSHAFT
MACHINING COSTS

PROBLEM: To automatically load, transfer and process camshafts through two machining and two gaging operations.

SOLUTION: The Lo-swing Antomation Method selected comprised two Model LR Lo-swing Lathes complete with necessary tooling, Lo-swing automatic work loading and transfer equipment, automatic gaging stations and the necessary control system.

Tooling is designed for rapid replacement. The front turning tools are fitted with adjusting screws which are pre-set in the tool room after the tools are ground. No tool setting is required at the machine. The rear facing and chamfering tools are mounted in magazine type tool blocks which are quickly replaced by other magazine blocks having pre-set tools.

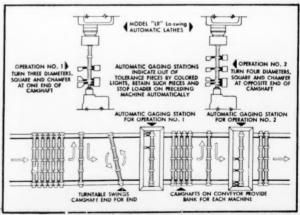
. The installation requires no operator and is so designed that cycle time on in-

Two standard 5" x 34" Model LR Automatic Lo-swing Lathes, each complete with necessary tooling, automatic gaging station, work transfer and work loading equipment, conveyor lines and control panels.

dividual machines may vary without disrupting overall operation. Safety and quality control devices instantly detect and signal off-tolerance pieces. Significant advantages of this Lo-swing Automation Method are:

- Elimination of operator fatigue due to mechanical handling.
- Reduction of labor and unit costs due to automatically controlled machining and handling time.
- Improved quality control due to automatic gaging as each piece leaves the machine.
- Reduction in work spoilage and salvage expense.
- Reduction in number of operators required for a production line.
- Elimination of damage to parts which frequently occurs with hand loading.
- Reduction of accidents due to limitation of human reflexes.
- Straight line conveyor feeding which simplifies plant layout.

Write for the new Lo-swing brochure, "Automation is the Answer", which illustrates and describes Lo-swing Automation Methods in detail.



PRODUCTION COSTS ARE LOWER WITH So-swing



* Roll Tables for Steel Mill





on a versatile, accurate

Cincinnati Press Brake

At Charles T. Brandt, Inc. speed, accuracy, and versatility are necessary to take care of large or small work in jobbing or production quantities.

Write for the New 72 Page Catalog B-4, describing operations, features, and special arrangements including wide beds and rams, bed and ram extensions, deeper gaps, higher die space and other features.

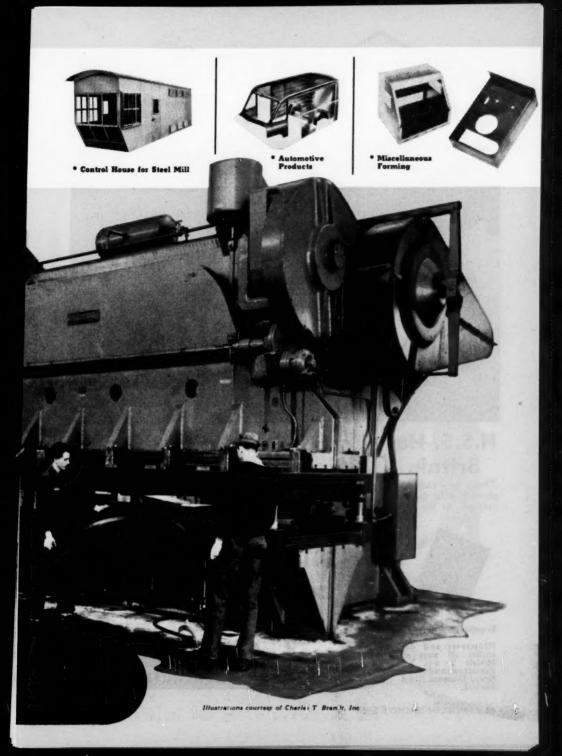




THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

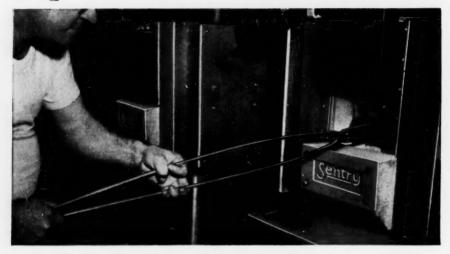
SHAPERS & SHEARS . BRAKES







5. hardening



H.S.S. Heat Treating at New **Britain Requires Accuracy**

That's why they rely on Sentry Model Y electric Furnaces (see above) with the renowned Sentry Diamond Block atmosphere control. At the Screw Machine Products Division of the New

Britain Machine Co., New Britain, Conn., they heat treat form tools, counter bores, reamers, gauges and fixtures, all of which must be completely free of decarburization perfect also. and oxidation. Only Sentry is "Always on Duty" to guarantee this high performance.



This dovetail form tool must be perfect. The heat treating must be



For optimum hardness with complete protection against scale or decarburiza-tion, heat treat H.S. steels with Sentry Model "Y" Furnaces and Sentry Diamond Blocks.

*High Speed Steel

Request Catalog N-15

Illustrates and describes all sizes of Models Y and YP Furnaces and The Furnaces and The Sentry Diamond Block Method.

24

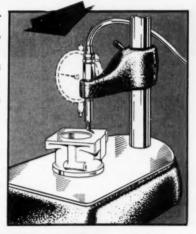




USE IT AS YOU WOULD ANY DIAL INDICATOR

Calibrated at our factory on the regular Dimensionair and available in .003", .006", .015", and .030" ranges: It's self-zeroing, so that no further calibrating is needed. Spindle travel of .140" total permits long overtravel. The Airprobe is water and oil-proof and is not affected by coolant on production machinery.

Ask us about this handy new instrument which can be used practically anywhere a Dial Indicator can be used. Federal Products Corporation, 4145 Eddy Street, Providence, Rhode Island.



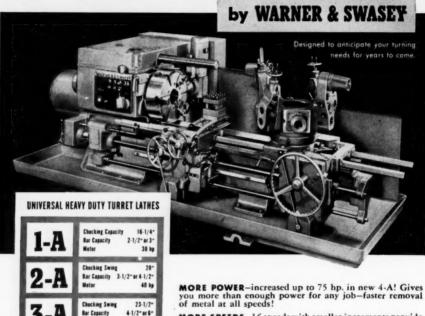
Ask FEDERAL

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic - for Inspecting, Measuring, Sorting or Machine Size Control

COMPLETELY NEW!

A whole new line of saddle type turret lathes...



WARNER & SWASEY Cleveland PRECISION MACHINERY SINCE 1880

Chucking Swing

Bar Capacity

Mater

60 kg

28-1/4

9" er 12"

75 hp

MORE SPEEDS-16 speeds with smaller increments provide ideal speeds for *more* work diameters, increased production and tool life! 32 *un-duplicated* speeds with 2-speed motor!

AUTOMATIC SPEED CHANGES— automatic hydraulic gear shifting in a matter of seconds on 2-A, 3-A and 4-A—boosts production, cuts operator fatigue! New 1-A's constant-mesh gear train with hydraulic clutches eliminates gear shifting completely!

SIMPLIFIED ZONE CONTROLS—eliminate waste, motion and facilitate machine handling—increase operator efficiency! Single master control lever controls gear shifting, spindle stops, starts, and reverses!

IMPROVED ATTACHMENTS – Hydraulic chuck and bar feed with power return—for easier handling, less operator fatigue! New power chuck wrench eliminates backbreaking effort when chucking. Does not obstruct spindle bore!

RETAINS STANDARD WARNER & SWASEY TOOLING—all existing saddle type tools of the world's largest and most complete line can be used on these new turret lathes.

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY



cooled system in the larger tappers. Strong, durable, attractively

finished housings.

Newly designed, true-running "balanced" chucks.

He's ready, willing and able to meet all your tapping and drilling equipment needs. You'll appreciate his friendly, efficient service. DISTRIBUTOR

BULLETIN 22A HAS DETAILS, WRITE FOR A COPY.



ETTCO TOOL CO., INC. 598 Johnson Ave., Brooklyn 37, N. Y.

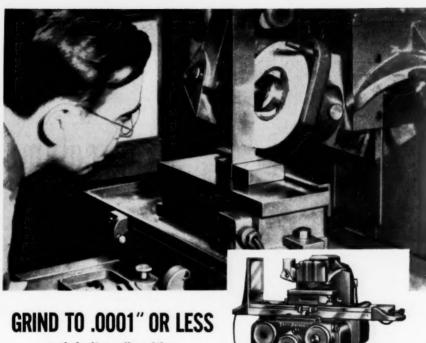
DETROIT - CHICAGO - WORCE! TER - SAN GABRIEL, CALIF. Dealers throughout the United States and Canada



benchmaster

Benchmaster

Manufacturing Co. 1835 W. Rosecrans Ave. Gardena, California



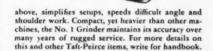
... and do it easily with a Taft-Peirce No. 1 Surface Grinder

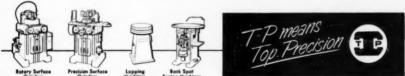
This Taft-Peirce No. 1 Surface Grinder produces surfaces of an accuracy, flatness, and finish formerly considered difficult or impossible to achieve. An experienced operator frequently can grind to .00005"... with surfaces so smooth, in many cases, they seal without lapping.

Table, saddle, and column travel on ball bearings retained in vees of hardened and ground alloy steel. As a result, there is practically no wear on ways and moving parts. Grinding time is sharply reduced.

Control of feeds is smooth and precise. You can repeat wheel positioning true to dial setting without fear of gouging the work. Vernier fine-feed attachments are available, for either the horizontal or vertical feed, for direct readings of .0001".

Another feature - a tilting wheelhead, as shown





THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND



Here's another reason it pays to get a proposal from Fosdick

Fosdick aligns the column

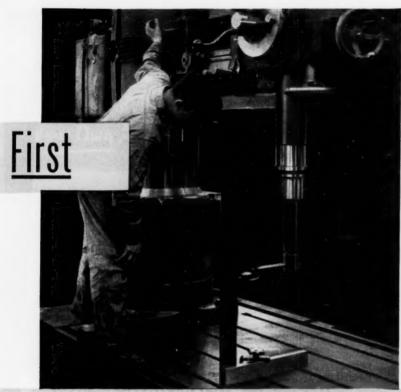
Radial alignment at Fosdick starts with the column. We run the arm up and down with an indicator bearing on a square (both lengthwise and across the base). Then, knowing that the column is square with the base, we proceed with conventional tramming and sweep tests. This procedure—used only by Fosdick—adds an extra degree of precision to the extra rigidity we have designed into our machines. It's another example of the pains we take to make sure you get the most out of your Fosdick Radial . . . in production, tool life, finish, tolerance.

Fosdick Hydraulic Radials are available with 3' to 8' arms, 11" to 19" columns. For full information, ask for Bulletin HRS.

to give you

Fosdick takes a "bite" out of boring time at Owen Bucket

Tough cast-steel hinges for clamshell buckets are bored to \$\tilde{\pmathcal{2}}\$.001" for a pressfit cast iron bushing—then counterbored for a washer. For this and a variety of other heavy-duty drilling, Fosdick's proposal on a 5' 17" Radial made sense. Now Owen Bucket Co. of Cleveland gets 10 pieces in the time formerly needed to produce 7. As Frank Matisak, General Superintendent puts it, "... now we can do more pieces with longer tool life—this machine is more rigid, giving us closer tolerances and better finish."



precision production like this

Need Drilling Equipment? Get a Proposal from Fosdick!

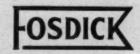










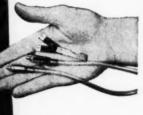


THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO



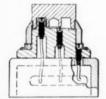
FOR LOW COST INSPECTION "PLUNJET"

CARTRIDGES
In Your Own Air Gaging Fixtures



At low cost you can design and build your own air gaging fixtures with PLUNJET gaging cartridges, available from stock. Size 3/8" square or cylindrical, 11/2" or 13/4" long. Tolerance range .100" to .001". Amplifications 62.5 to 5000. High accuracy at low cost.

Gage Division, The Sheffield Corporation, Dayton 1, Ohio



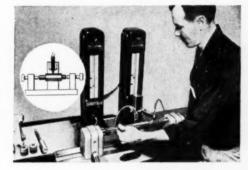
Depth and shoulder height

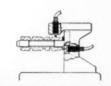


Inside diameter and flatness



Diameter and Taper





Concentricity and squareness

FREE

SEND TODAY

FOR YOUR

PLUNJET

DATA BOOK

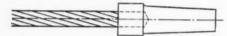
6721



HEFFIELD



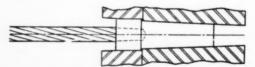
Clean, Quick, Economical



An electrical equipment manufacturer wanted a way to fasten terminals to cables-a way that would give perfect bonding-a way that was cleaner and faster than soldering or brazing.



Torrington's swaging experts showed him how to attach terminals to cables by one fast rotary swage.



Result: a clean, secure joint between cable and terminal, and accurate sizing of the plug end of the terminal at the same time.

Look at the savings that swaging can bring!

- 1. Savings in material and equipmentno solder, no brazing or dipping equipment needed.
- 2. Savings in labor-swaging can be done by unskilled personnel.
- 3. Savings in time-swaging is fast, clean and precise.

For more information on swag-ing as a method of bonding or reducing metals write for our informative booklet. It contains complete descriptions of the Torringion Rolary Swagers and may give you some ideas for a "swaging success story" in your own plant.



THE TORRINGTON COMPANY

Swager Department
730 North Street, Torrington, Conn. Makers of Torrington Needle Bearings

DRRINGTO

Bellows-Locke DRILL UNIT

Combines

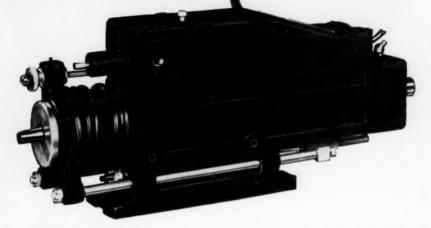
HYDRAULIC FEED

AIR POWERED

RAPID ADVANCE

ELECTRICALLY DRIVEN

SPINDLE



Full 3" stroke—any part usable. Takes up to 5/16" drills. Either pulley driven or direct motor drive models available. Compact, stream-

lined, lightweight. Can be mounted at any angle in any plane. Any number of units can be easily synchronized and interlocked for accurately timed sequence operation.

WRITE TODAY FOR BULLETIN BL-5

ADDRESS DEPT. MMS-554

919A

The Bellows Co.

AKRON 9, OHIO

In Canada:

Pneumatic Devices of Canada, Ltd., Toronto, Ontario



With new heavy duty

NEW!

Larger

"TRU-GRIP"

TAP HOLDER

TAP KING tapping attachments

Whether you're tapping in 11/2" steel plate, threading 3/4" pipe, tapping "blind" in steel castings or open tapping in high carbon forgings-you'll be amazed at the "handling ease" of this heavy duty tapping attachment. Large capacity, greater thread accuracy, ruggedness and easy finger tip control are an unbeatable combination of features found only in the Tap Kingl The secret is in the heart of the unit which includes: an improved highly sensitive friction clutch; a new helical gearing mechanism, ball and needle bearings and the exclusive 17 tooth spline drive from clutch to tap holder gives a smooth, powerful drive with less strain, wear and vibration.

These are only a few of the many features found in the TAP KING. Find out more about this "production" marvel, see how it can increase your production, save on tap



breakage and parts spoilage, and give you an accuracy and uniformity on large hole operations that you're not getting now.

Write for FREE brochure

giving full details and specifications on the TAP KING and the complete line of Procunier Tapping Attachments.

	TAP KING and the complete line of Proc Tapping Attachments.	
	PROCUNIER SAFETY CHUCK CO. 12 S. Clinton St., Chicago 6, III. Dept. 5	easier tapping close to walls or shoulders, eliminates
	Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the Tap King and your complete line of tapping attachments.	
	Name	Safety Chuck Company
	CityState	12 CUNTON ST CHICAGO & III

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

METALLIZING	ENGINE	ERING	CO., INC.
38-14 30th Street	AFTER	LONG	ISLAND CITT I. N. Y.

... and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours. Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

			me B		land City	-,
_						
	Please	have	Metco	Field	Engineer	call.
Co	mpany					
St	reet_					

it does more work (and the operator does less)

Simple, least-effort controls: color-coded dial selection of 24 spindle speeds; four levers for totally enclosed gear box; tailstock wheel set at angle for easiest operation; wheel has two speeds, one for normal operation, one for drilling; chip pan on casters for quick movement to insure cleaner, safer floors.

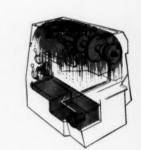


it runs cooler

Continuous oil-mist lubrication of all headstock gears does more than lubricate; it carries heat away into large sump in headstock leg. Cooler head minimizes distortion during warmup; markedly improves accuracy and stability of work alignment.



The headstock has only four gears in mesh at once for any speed. Other gears run free; flywheel action adds to stability. No "pass-through" gears in shifting.



it promotes cleanliness—and safety

Clean modern design encourages good shop practices, better maintenance; builds pride in workmanship and better quality in work produced.

Engine and toolroom lathes:

swings 14" to 32'

Contouring and reproducing lathes:

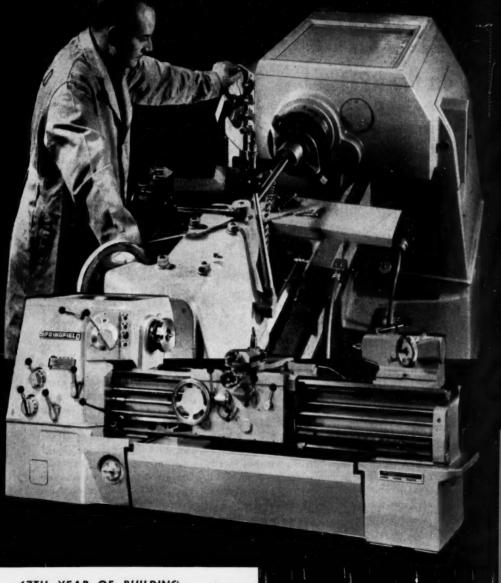
swings 14" to 32'

Universal vertical grinders: swings 21" to 52"

write for name of your nearest dealer



because it's simple



67TH YEAR OF BUILDING
IDEAS INTO MACHINE TOOLS

These 2
LEVERS

on the RPMster



Add an Extra
Profit Margin
to your
Drilling

The exact required speed for the size of drill, the material hardness or the tapping or reaming operation you're about to start — instantly, without

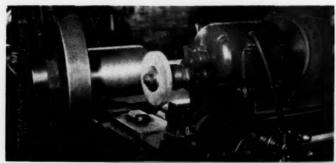
shutting off the motor! It's not only a big convenience to the operator of the "Buffalo" RPMster, but it shaves valuable minutes off every operation. These heavy, ruggedly built "drills with 1001 speeds" are setting some excellent profit-drilling records in shops industry-wide. Back gearing and power feed, too, are standard equipment. Better write today for Bulletin 3257A for the facts on these machines that all but think for the operator!



BUFFALO FORGE COMPANY

388 BROADWAY BUFFALO, NEW YORK CANADIAN BLOWER & FORGE Co., LTD., Kitchener, Ont.

DRILLING . PUNCHING . SHEARING . BENDING



EXTERNAL

(Wheel Guard removed for clarity)



INTERNAL >

Your Lathe Will Do Precision Grinding!



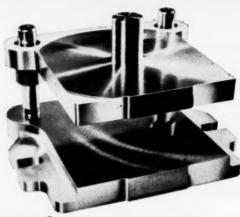
Ordinary lathes are easily converted with HISEY Precision Grinders.

Pulley selection gives correct speed for any size or type grinding wheel. External or internal grinding available—for internal wheels as small as %" diameter—external up to 24". Regardless of load, constant speed motor insures uniform, efficient grinding.

Illustrated at left is the grinder with external spindle mounted, and 2 of the many internal spindles available. Grinder can also be mounted on shapers, boring mills, and planers for surface grinding operations.

Write today for catalog 72 ML!





DANLY'S IN THE PICTURE

at Eastman Kodak Company

Danly Die Sets play an important role in the manufacture of Eastman's popular new Brownie movie camera and Brownie movie projectors . . . latest in the Eastman line that Danly Die Sets have helped build all through the years. Used to mount high precision dies, Danly Die Sets help bring "master die" accuracy to every finished part. But Danly Die Sets do more . . . even before a press run ever starts. They make tooling-up easier, faster—save you many, many hours in the die shop. And remember, Danly Die Set service is as quick and convenient as a phone call.

DANLY MACHINE SPECIALTIES, INC. 2100 South Laramie Avenue, Chicago 50, Illinois



DIE SETS STANDARD OR SPECIAL DIEMAKERS' SUPPLIES

PICK THE DANLY BRANCH NEAREST YOU!

- CHICAGO 50 2100 S. Laramie Avenue *CLEVELAND 14 1550 East 33rd Street DAYTON 7 3196 Delphos Avenue DETROIT 16 1549 Temple Avenue GRAND RAPIDS 113 Michigan Street, N.W. INDIAWAPOLIS 4 5 West 10th Street LONG ISLAND CITY 47-28 37th Street LOS ANGELES 54_ Ducommun Metals & Supply Co., 4890 South Alameda MILWAUKEE 2 111 E. Wisconsin Avenue PHILADELPHIA 40 511 W. Courtland Street
- *ROCHESTER 6_______33 Rutter Street

*Indicates complete stock.



COMPARE

... PRICE!... FEATURES!... PERFORMANCE!

GREAVES

... WILL BE YOUR CHOICE!

"The Most Mill For The Least Money"

Now you can make the same painstaking comparison that sold and satisfied leading plants on Greaves 2H plain and universal milling machines. A free chart cross-compares 22 significant specifications . . . including speeds, feeds, power and capacity . . . on each of the eight leading milling machines.

Make your own comparison...in your office, out on the factory floor or right out of our competitors' catalogs... we're convinced you'll find that Greaves is your best buy!

GREAVES MACHINE TOOL COMPANY, 2700 EASTERN AVENUE, CINCINNATI 2, QHIO
Please send me the COMPARISON CHART.

Firm_____

May, 1954

WRITE FOR

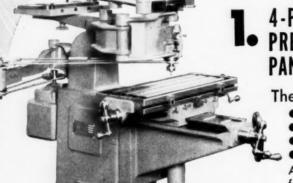
COMPARISON

OF THIS EYE-OPENING

MODERN MACHINE SHOP

41





4-PURPOSE PRECISION PANTOGRAPH

The "Panto-Miller"

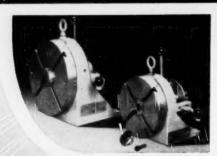
- Engraves
- Profiles
- Die Cuts
- Mills

A sturdy, production tool for 2-dimensional cutting in steel, cast iron, nonferrous metals and plastics.

Pantograph reductions from 1:1 to 1:40. Spindle speeds infinitely variable from 1,200 to 11,500 RPM without belt changing.

Extreme accuracy and freedom of motion. Write for "Panto-Miller" details.

JOHNSON & BASSETT, INC. Production Tool Div. BOX 1251, WORCESTER, MASSACHUSETTS, U. S. A.



2. RAPID, ACCURATE JIG POSITIONING

This indexing trunnion, with station selector, accurately holds and locates either jig or work. SIMPLIFIES JIGS. REDUCES SET-UP TIME.

Ask for "TRUNNION" information

ELIMINATE INSPECTION REJECTS —CAUSED BY IMPROPER DRILLING MACHINE-GRIND your DRILLS with OLIVER DRILL POINTERS

Improperly ground drills make imperfect holes . . . cause rejects, production lags and increased costs. Eliminate this unnecessary bottleneck the Oliver Way:

To increase the wearing life and efficiency of your drills, remove them at the first sign of dullness — sharpen them the way that has been proved best . . . with OLIVER DRILL POINTERS.

MODEL #21

The balanced cut obtained

with OLIVER DRILL POINTERS means that each lip of the drill does equal work — makes more perfect holes.

OLIVER machine-ground drills assure uniformity and . . . they last from 2 to 3 times longer than hand-ground drills.

No. 510 for drills ¼" to 3"—2-3-4 flute. Variable clearances. Variable point angles. Automatic operation.

No. 21 Oliver Bench Grinder. Hand operated for Drills No. 57 to ½" right hand, with an improved point. Attachments are available for grinding oil hole drills, left hand and other special points.

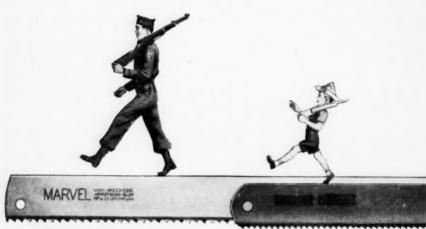
Write for our free Booklet "How To Produce More Holes With Your Drillst" See our catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1430 E. MAUMEE . ADRIAN, MICHIGAN

MACHINE TOOLS by OLIVER Include:

AUTOMATIC DELL GRINDERS TOOL & CUTTER GRINDERS DRILL POINT THINNERS TEMPLATE TOOL GRINDERS FACE MILL GRINDERS



... but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how"...

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. Whenas-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon genuine MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. . 5700 Bloomingdale Ave. . Chicago 39, U.S.A.

RYAN HITS THE JACKPOT!

With a combination of "AMERICAN" Hole Wizard Radial Drills and ingeniously designed fixtures Ryan Aeronautical Company of San Diego, California, produces Aft Frames for the General Electric J-47 jet engine in record time.

The operations performed include precision boring, facing and undercutting of the stainless steel support flanges. Close tolerances must be and are held.

Credit is due the "Ryan" engineers for developing such workable and time saving fixtures. Credit is also due the "Ryan" officials for selecting "AMERICAN" Hole Wizard Radials as part of the "winning combination."

"AMERICAN" Hole Wizards are sturdy; they are powerful; they are easy to operate and they retain their original accuracy for years to come. For substantiation just ask the operator.

THE AMERICAN TOOL WORKS CO.

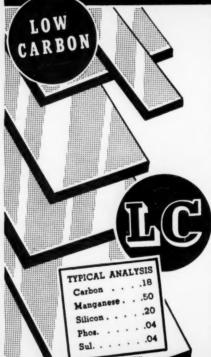
AMERICAN

Cincinnati 2, Ohio, U. S. A.

ARISTOCRAT OF LOW CARBON GROUND FLAT STOCK

MARSHALLCRAT

Use it for Jigs, Fixtures, Patterns, Machine Parts or other pieces that require nothing more than case hardening.



- . IT IS EASY TO MACHINE
- . GRINDS TO A GOOD FINISH
- TAKES A GOOD CASE
- . HAS EXCELLENT WELDABILITY
- OVER 190 Standard sizes in stock

We stock over a million pounds of steel. . .24 thicknesses up to 6 inches, 25" wide and 98" long. Modern Shear and flame cutting, including sketches.

Also a bar, strip and plate grinding service. New up-to-date facilities including most advanced grinding equipment. It will pay you to investigate.

Write for latest catalogs & prices

The world's largest range of sizes of precision ground tool steel available.

WATERCRATE A fine grained electric furnace high carbon tool steel. It has been wet ground to remove all bad surfaces and to assure velvet finish of virgin metal.

Ollcrat: An outstanding product of careful handling assures you of a fine grained electric furnace oil hardening ground flat stock ready for the layout bench.

AlRerat: This air-hardening tool steel shows less size change and offers a greater safety in hardening than either of the other grades.

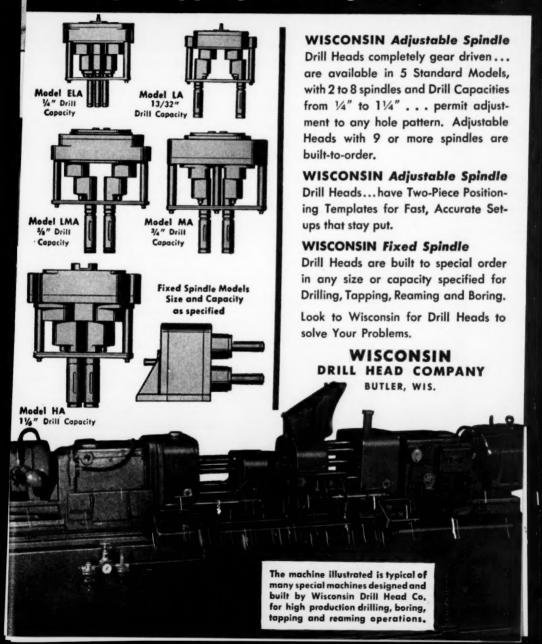
Write for descriptive literature, catalog of sizes and prices.

LOW

The Aristocrats of Ground Tool Steel

P. O. BOX 108M LA GRANGE, ILLINOIS

HEADS to Solve Your Drilling, Tapping, Boring Problems



CUT COSTS WITH MULTIPLE BENDING

Whether you're bending pipes, tubes, reinforcing bars or structural shapes, you can greatly increase your bending production by multiple die bending.

Shown here is our Model A-5 BENDING MACHINE, tooled for bending 3 different radii without changing the set-up. In order to make multiple bending cost no more per die than single bending, individual dies are merely stacked on the die spindle and a shoe of the proper width permits the same degree to be bent without changing the automatic reset switch. The MODEL A-5

will bend pipe up to and including 2" standard weight pipe.

Redesigned and greatly improved, the Model A-5 still sells for only \$1975. F.O.B. factory, U.S. Funds.

Smaller and larger machines available.

Write for detailed and descriptive folder.

PEDRICK TOOL & MACHINE CO.

3640 N. Lawrence St. Dept. 5, Philadelphia 40, Pa., U.S.A.



the thread of this story depends on . . .

The coils manufactured by the Trane Company, La Crosse, Wisconsin, are the heart of the heating and cooling equipment they produce. Threaded cast iron headers used in many of these coils require cleanly threaded and finished holes that must be absolutely rustfree. Up to 1936, various soluble oils had been tried but none successfully eliminated rusting. On the advice of a Standard Oil lubrication specialist a switch to SUPERLA Soluble Oil was made with marked success. With SUPERLA on the job, rejections due to rusting were completely eliminated. In addition, the quality of the threads has been superior.

SUPERLA Soluble Oil can help you find a happy solution to your lubrication problem.

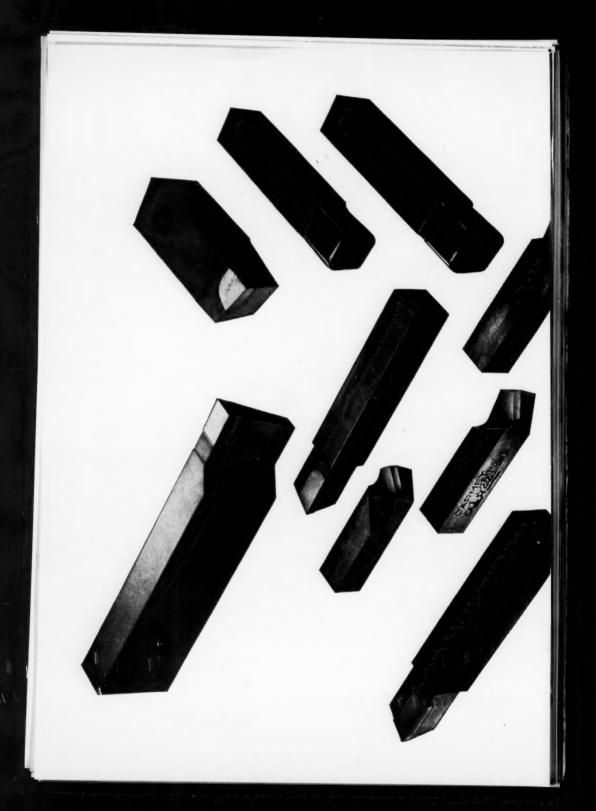
SUPERLA REG. U. S. PAT. OFF. Soluble Oil

For the help and advice of a Standard lubrication specialist call your nearby Standard Oil office or write: Standard Oil Company, 910 South Michigan, Chicago 10, Ill.

STANDARD OIL COMPANY



(Indiana)



Handle any Cutting Job ••• Cut your Cutting Costs—with

What other jobs have you for CARMET

We specialize in precision preforming of Carmet carbide metals to any shape for special wearesistance needs, such as dies, gage blanks, etc. Let us quote on your requirements.

White for your copy of the new CARMET CATALOG



The Allegheny Ludlum line of Carmet Carbide Tools is complete—every style, size and grade you may need for any cutting job in the shop. If you make your own tools, a full line of blanks is available, too—as well as all necessary sizes of A-L Shank Steel. Extensive stocks of Carmet standard tools and blanks are carried in Distributor's warehouses coast to coast, and special tools are available to order.

• Just remember, for best performance on any application, use Carmet! Allegbeny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Michigan.

For complete MODERN Tooling, call Allegheny Ludlum



FROM PEDESTAL GRINDERS



Complete
Shop
Installations



TORIT

WILL SOLVE YOUR DUST PROBLEMS

TORIT Manufacturing Co. 296 WALNUT STREET ST. PAUL 2, MINN. Industrial dusts are dangerous. They can damage precision machines or finished parts, create bad working conditions, reduce employee efficiency, and increase your insurance rates.

Whether it's just a single pedestal grinder or a whole battery of cut-off, grinding and polishing machines, Torit Dust Collectors will solve your dust problem—do it efficiently, economically and with a minimum of interference to your production layout.

Standard Torit Dust Collectors fit most situations and special adaptations can be quickly created, write for full information. MACHINE HOOL



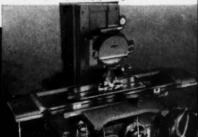
The New OVEL NO. 10

LOW COST POWER AND HAND FEED SURFACE GRINDER

All-new 6" x 8" Surface Grinder for low cost precision gage, form tool work and surface grinding. Grinds 6" x 18" x 15" under 7" dia. wheel. Table speed, 10 to 50 FPM., longitudinal table travel, 20". Table driven by special timing belt eliminating rack and gear. Adjustable automatic cross feed .002 to .050 at end of each table stroke. Any 1 H.P., 3600 RPM direct motor driven spindle can be adapted. Hand scraped ways, dust proof motor control enclosure, one shot lubrication system, heavy, rugged construction.

Send for Bulletin M-54
See Cevel machines in operation
R. O. DEADERICK CO. SHOW MAY 19, 20, 21.
Atlanta-Biltmore Hotel, Atlanta, Ga.

Set-up for grinding snap gage using indicators and rods



SO YEARS of

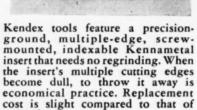
facturing experience makes your COVEL OVEL PRECISION GRINDERS

BENTON HARBOR, MICHIGAN

DRILL GRINDERS . UNIVERSAL CUTTER & TOOL GRINDERS . HYDRAULIC & HAND FEED SURFACE GRINDERS

It isn't KENDEX* unless it's KENNAMETAL*

KENDEX' is the Registered Trade-Mark of Kendex Tools which are made exclusively by Kennametal Inc.



regrinds. Kendex tooling minimizes downtime for tool changing, eliminates tool grinding expense, and ends the false economy of reconditioning tools that have outlived their usefulness. Ask your nearest Kennametal representative for details. Kennametal Inc., Latrobe, Pa.



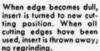






Hard, strong, wear-resistant Kennametal is molded into square, round, or triangular Kendex inserts, which are precision ground.

Kendex inserts are mounted to suitable tool holders with socket head screws.







CEMENTED CARBIDE TOOLING THAT INCREASES PRODUCTIVITY

*Registered Trade-Marks

SALES OFFICES IN PRINCIPAL CITIES



Maybe it's a crankshaft or an armature... perhaps a fan or a belt pulley. No matter. The important thing is this: If it isn't balanced, it isn't ready for service.

Smooth operation and long life require that accurate static and dynamic balance be rated right along with mechanical specifications to assure the efficiency of the finished product.

Gisholt Balancing Machines can locate and measure unbalance vibrations down to .000025" with simple readings... handle any assembly from ½ ounce to 50 tons.

The cost? Very moderate. Let Gisholt Balancing Machines provide the final check. Write us.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and halancing of round and partly round parts.

Your problems are welcomed here.

GISHOLT

PANY
Madison 10, Wisconsin

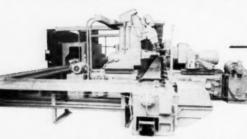
The Gisholt Type 3U Balancer shown here is capable of balancing rotating parts or assemblies weighing from 50 to 1000 pounds. Other sizes and types are available to answer any balancing problem. Gisholt Balancers can also be furnished with correction equipment to meet your own specific requirements.



New Driver prevents tap

Scully-Jones Safe-Torque Driver rapidly being adopted to cut tapping costs!

Here's why Safe-Torque Drivers are being adopted so rapidly by machine tool builders and users. On the job illustrated, breakage has been virtually eliminated. On a radial drill, only two taps were broken tapping 500,000 holes—former average was a broken tap for every 200 holes. This is the result of two important features. (1)—A spring-loaded centering plug absorbs shocks when bottoming in blind holes. The cushioned stop and quick release of drive permit bottom-tapping at full speed to full depth without breakage. (2)-The overrunning roller drive releases completely when tapping torque reaches a preset danger point. There's no intermittent overriding motion . . . no slipping friction surfaces to cause wear, poor torque control and inaccurate work. Hard spots, poor chip removal, inadequate cooling or lubrication, and improper sharpening of taps are brought under control. Call your Scully-Jones representative or dis-tributor—factory trained "Precision Tool and Work Holding Specialist"—for details today.



May be used in any machine having a

spindle.

Patent Pendina

Transfer machine, built by Buhr Machine Tool Co., Ann Arbor, Michigan, is factory-equipped with special Scully-Jones Safe-Torque Drivers for safe tapping in automobile clutch housings.

THERE'S A SCULLY-JONES PRECISION TOOL FOR

Drill Chucks

for driving straight shank tools.

Permit use of jobber length
drills, saving extra cost of taper
shank drills.

Tap Chucks

save costly setup time. Eliminate bell-mouthed and oversized tapped holes. True collet action on shank of tap.

EVERY HOLDING OR DRIVING NEED

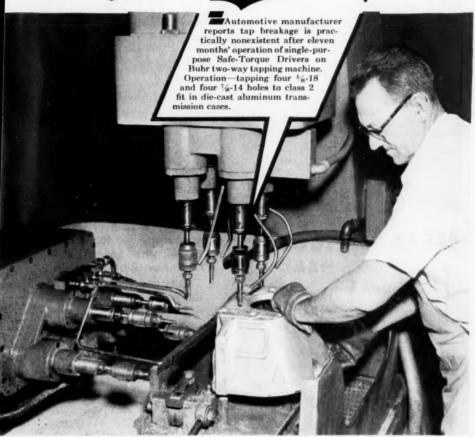
Close-Center Tap Drivers

for tapping holes close together or near shoulder of work. Collet action minimizes strain and saves taps.

Quick-Lock Adapters

permit accurate depth adjustments in cluster of spindles. Stop guesswork on fine adjustments. Speed tool changes.

breakage on Buhr Specials



SCULLY JONES

Precision Holding

Scully-Jones and Company 1909 South Rockwell St., Chicago 8, Illinois

WRITE FOR NEW BULLETIN 20-50



Gives you important features, specifications and field test reports on Safe-Torque Drivers.

Gentlemen: I'm interested in learning more about Scutly-Jones Safe-Torque Tap Drivers.

☐ Please send Bulletin 20-50
☐ Have representative call

Name_____

Address... State





Boring, facing, turning, grooving, undercutting, all in one set-up with Chandler Duplex.

This boring and facing head has many points not found in conventional makes . . . such as power feed for facing, longer slide travel, extremely fine adjustment, tee slot positioning of cutting bar, universal range and adaptability.

Feed screw dial calibrated to read .0005. Movement of slide .025 inch per revolution of screw. Write today for complete details.

CHANDLER TOOL CO. Muncie, Indiana, U. S. A.

Chandler Duplex

Beat Rising Production Costs . .

MODERNIZE with a NEW



PRATT & WHITNEY

MODEL "D" HYDRAULIC VERTICAL SURFACE GRINDER

FOR YOUR PRESENT GRINDING JOBS OR TO REPLACE OTHER METHODS

This new P&W Model "D" has everything it takes in construction and advanced design to handle your present surface grinding jobs faster and more accurately . . . and, as a simple cost analysis will prove, will bring new economy and finer finishes to many operations now handled by planing, milling and other machining methods.

Featuring:

. CENTRALIZED CONTROL . HEAVY CONSTRUCTION . POWERFUL MOTOR . HIGHER TABLE SPEEDS . IMMEDIATE PRODUCTION GRINDING WITHOUT WARM-UP . PRECISION CONTROL FOR TABLE TRAVERSE . MEETS J.I.C. SPECIFICA-TIONS BOTH ELECTRICALLY and HYDRAULICALLY





SEND THIS COUPON FOR COMPLETE INFORMATION



MMS-54 PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

25 Charter Oak Blvd., West Hartford 1, Connecticut Please send my free copy of Circular No. 569.

NAME_

POSITION_ COMPANY_

COMPANY ADDRESS

ZONE___STATE_

ELECTRICAL CONTROLS FOR INDUSTRY

NEU I ROL ELECTRO-MAGNETIC CHUCK CONTROL



50 to 15,000 Watts ... 60 to 20,000 Sq. In. Chuck Area.

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production

ELECTRO-MATIC RECTIFIER



50 Watts to 40 Kilowatts

Engineered for dependable power conversion in constant year after year service. Quiet and efficient. For all industrial applications.

NEUTROLATOR

NEUTROL CHUCK CON-TROL and HOLDING POWER REGULATOR





through entire dial range. Best holding power predetermined for an operation is automatically repeated. Assures true parallel grinding. Manual or automatic control models.

ELECTRO-MATIC A.C. DEMAGNETIZER

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact, Operates on standard A.C. voltage. Will not overheat through





All Models Fully Warranted

Special Models Engineered to Meet Every Need Your Inquiries Will Be Promptly Answered Without Obligation.

ELECTRO-MATIC PRODUCTS CO.

2235-37 N. KNOX AVE., CHICAGO 39, ILLINOIS, U. S. A.

Jones & Lamson offers...
a complete line of die heads & chasers











Automatic opening tangent stationary and revolving types, radial stationary type, B&S and small turret lathe types









External and internal trip attachments, drill press adapter, floating holders

a complete line of sharpening equipment









Chaser sharpening machine, sharpening fixture, measuring gages



World's newest, most modern thread tool plant. Complete literature for all J&L thread tool products



J&L Automatic Opening Die Heads and Chasers assure: low initial cost - ease of operation - controlled resharpening - use of carbide where applicable. Class III threads guaranteed. This means important savings regardless of your tolerance requirements. Write to Dept. 710 for complete information.



Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

NOW!

new speed and economy—
added ease and convenience-

APEX

MAGNETIC THE BIT HOLDERS



and INSERT BITS

Any Apex magnetic bit holder will accommodate a full range of Apex insert bits. All bits are easily and quickly interchanged in the holder, permitting a minimum bit inventory to cover most screwdriving requirements. Insert bits "float" slightly in the holder to provide easier alignment with screw recess and to reduce bit wear. Insert bits may be economically discarded when worn; bit holders last indefinitely.

Available for power, spiral and hand drivers



APEX Magnetic Hand Driver Standard Length, Superloid Handle

Manufactured under Patent Nos. 2,550,775-2,522,217

Originators and Pioneer Developers of Bit Holders and Insert Bits

Non-Magnetic Bit Holders, Power Bits, Hand Drivers, Offset Drivers, Finder Sleeve Assemblies, Combination Hand Screw Drivers, Service Drive Bit Holders and Bits.

for your production screwdriving and nut running!

APEX

Apex MAGNETIC Bit Holders and Sockets place screwdriving and nut running among the simplest and fastest of all production operations. Your tool operators gain a new dexterity that eliminates costly lost time and motion when starting screws and nuts. Apex MAGNETIC operation is at its best in those hard-to-reach spots, even permits working straight down when necessary.

A permanent magnet in bit holders and sockets holds the screw or nut firmly in position. Bit holders have a bit retaining ring to keep the insert bit in place. This patented Apex construction prevents insert bits from pulling out of holder when in operation.

Apex offers the speed, economy, ease and convenience of a complete MAGNETIC operation for every production screwdriving and nut running application. Start now to reduce your driving and fastening costs by getting the facts about Apex MAGNETIC screwdriving and nut running.

APEX

MAGNETIC

for Sheet Metal Screws



Available with broached openings from 1/4" to 1/4", for driving sheet metal screws, hardened and commercial cap screws.

for Hex Head Nuts



Available with broached openings from $\frac{1}{2}$ " to $\frac{1}{2}$ ", for running hex head nuts, bolts, pal nuts, etc.

Apex Magnetic Sockets, for use with power, spiral and hand drivers, have a permanent magnet which holds the screw or nut firmly in position. Saves time in starting and fastening work in hard-to-reach areas, permits one-hand operation when necessary.

CATALOG 21

The authority on screwdriving and nut running tools, includes complete listing, specifications, prices. 56 illustrated pages. Write, on your company letterhead please, for your copy.

EMAGNETIC = bit holders, sockets

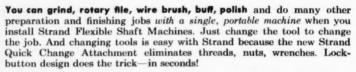
THE APEX MACHINE & TOOL COMPANY
1027 S. Patterson Blvd., Dayton 2, Ohio



FLEXIBLE
SHAFT
MACHINES...
versatile
finishing

finishing facilities—





Operating speeds from 850 to 12000 RPM are available in the famous Strandflex 4 & 5-Speed Gear Drive Machines, powered up to 1 HP...and you can select your operating speed without changing pulleys or belts, without using tools. New Strand High Speed Gear Attachment gives operating speeds up to 27000 RPM, suitable for high speed steel or carbide cutters . . . by tripling the rated spindle speed.

Best of all—you are assured of better workmanship, higher output, less operator fatigue, because the operator lifts only the tool—not the heavy, bulky motor. And your Strand machine is *portable*—take it to any part of the plant where the work can be done best.

FREE CATALOG illustrates and describes all Strand units, including Strandflex machines, as well as conventional Direct Drive and Countershaft machines with up to 3 HP motors. See your Strand Distributor or write today for Catalog 331-A.



N. A. STRAND DIVISION Woodberry, Baltimore 11, Maryland 5001 N. Wolcott Ave., Chicago 40 III

Strandflex

GREENLEE



This method of feeding out stock was developed primarily for the many screw machine jobs that require either multiple feed-out arrangements, greater feed-out length than the conventional mechanical arrangement will permit, or for machining parts made from ground stock where pusher marks would be objectionable. It can be adapted to all 1" and 1.5" GREENLEE Automatics.

Right Simplification of the food can be seen to the se

(PNEUMATIC STOCK FEED)

FEEDS OUT STOCK TO 161/4"

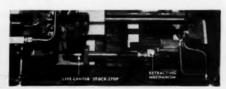
PROVIDES MULTIPLE FEED-OUT

ELIMINATES STOCK SCORING

REDUCES STOCK REEL NOISE

ELIMINATES STOCK PUSHERS

ELIMINATES FEED-OUT CAMS



Above: A method used for feeding aut stack during the machining syde. The stack is fed out against an adjustable live-tander stack-step errangement, When the collett jews use closed, the live-tander retreats and permits the stack to restee from and permits the stack to restee from and permits the

Write for Free Literature

GREENLEE BROS. & CO., 1885 MASON AVE., ROCKFORD, ILL.

clocked at 5800%





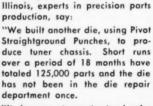
INCREASE PRODUCTION AT ERA TOOL AND MFG. CO. MORE THAN 65 TIMES!

Three of the eleven holes to be perforated in .042, ¾-hard, clock brass were to be .019, .023 and .027 — holding .0004 tolerance with 125 micro finish or better. That's a tough job — and production with the original die and ordinary punches, using the quill or point guide principle, was 15 to 600 pieces per set-up.

Then the die was equipped with Pivot Straightground Whipsleeved Punches. Production immediately averaged 40,000 — with no rejects — without breaking a single punch!

You, too, can gain the advantages of greater concentricity, accuracy, power and longer punch life, at minimum maintenance cost. Put Pivot Punches to work for you NOW.

SEND FOR FREE CATALOG AND
STANDARD PRICES, WRITE DEPT. M.M.



Mr. Ervin Lonze (left), President, and Mr. Kenneth Rolin (right).

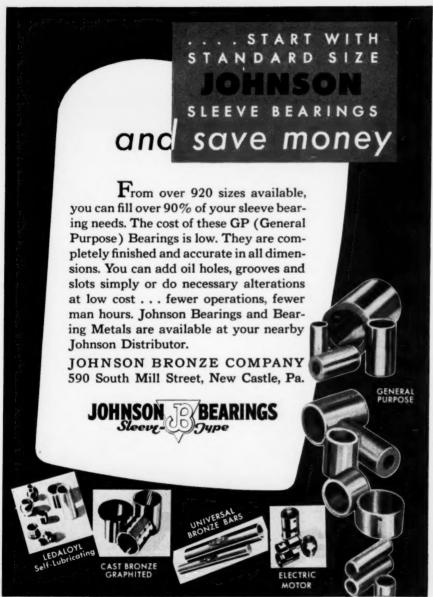
Chief Tool Engineer of Era Tool and Mfg. Co., of Franklin Park,

"It is easy to understand why we have standardized on Pivot Straightground Punches and why we now are building better dies for less."



pivot punch and die corp.

MORTH TONAWANDA, M.



Write for the Johnson Bearing Catalog

CUT ANY METAL to close



Stroboscopic photo "stops" wheel for 1/10,000 of a second. (Guards removed to show detail.)

Continually putting MORE SENSE in your ABRASIVE D

"Carborundum" and "Carboflex" are trademarks of The Carborundum Company, Niagara Falls, N.Y.



tolerances...IN SECONDS

with Abrasive CUT-OFF Wheels by CARBORUNDUM

Cut off any metal in seconds...ferrous or non-ferrous...annealed or unannealed...in solid bars, thin or heavy walled tubes, or sheets up to 4" thick...with Abrasive Cut-Off Wheels by CARBORUNDUM. The right wheel on the correct machine cuts from 12 to 20 times as fast as a power hacksaw, eliminates extra grinding, milling or other finishing operations usually required after shearing or flame cutting. You can figure on 6 seconds per square inch as average cut-off time on solid steel bars with up to 3 square inches of cutting surface, for example.

RUBBER BOND CUT-OFF WHEELS by CARBORUNDUM for wet cutting hold tolerances to thousandths... produce smooth, clean cuts free from burr or discoloration. CARBORUNDUM® Brand Rubber Cut-Off Wheels are made as thin as 0.005"—for slitting fountain pen points and similar small, close-tolerance applications; and as large as 26" in diameter—for heavy cutting off operations in steel mills and other metalworking industries.

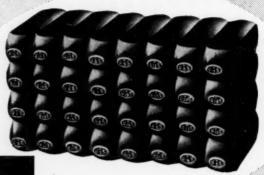
CARBOFLEX CUT-OFF WHEELS are the newest in CARBORUNDUM'S complete line. They are fabric-reinforced to give adequate safety in the most severe cutting off operations. They cut fast, effectively... are best for portable operations, such as cutting or slotting gates and risers, undercutting heavy welds, and general cut-off and slotting. CARBOFLEX Cut-Off Wheels are available in diameters from 6" to 20"—in both Silicon Carbide and Aluminum Oxide.

RESINOID BOND CUT-OFF WHEELS by CARBORUNDUM for dry cutting at high speeds do an effective job when fast production is more important than quality of cut—and when initial investment in cut-off machines must be kept low. On 1" diameter bar stock you can hold length to plus or minus .020" with ease, because CARBORUNDUM® Brand Resinoid Cut-Off Wheels are scientifically controlled in manufacture to insure balance, running truth and straightness.

YOUR CARBORUNDUM DISTRIBUTOR OR SALESMAN is ready to assist you... to put abrasive cutting to work, profitably, in your plant. Call him today—he's listed under "Abrasives" or "Grinding Wheels" in the yellow pages of your telephone directory. Or write to The Carborundum Company, Dept. MM 81-43, Niagara Falls, New York.

CARBORUNDUM

8x-43A



RETAIN CONTROL

with INSPECTION and CODE STAMPS



These inspection and code stamps enable a manufacurer to retain control of his product wherever it goes. A single glance can provide such information as the identity of a welder, inspector, operator, or assembler—heat number, lot number, material or date of manufacture.



Choose your own code from any of 300 stock designs, available in any desired size, in either the economical HI-DUTY Brand or even longer-lasting HI-LOY Brand. You'll get permanent identification through use of code designs, with key letters or figures if desired.

"IF IT'S WORTH MAKING, IT'S WORTH MARKING"...



Geo. T. Schmidt marking engineers will help you develop a code control plan without obligation. Write for particulars.

GEO. T. SCHMIDT, INC.

1806 West Belle Plaine Avenue

Chicago 13, Illinois

Goodbye Elbow Grease/



<u>Portable</u>

POWER HACK SAW



TAKE IT EASY—let electricity do your muscle work! Hand-I-Hack eliminates the sweat and fatigue of hack sawing. Plugs into any wall or light socket. Truly portable — can be carried anywhere with one hand. Has swivel vise — operates in any position: horizontally, vertically, at an angle, even upside down. Maximum capacity: 3" x 3" square cut. Uses lower cost standard 10" hand blades — will cut solid bar stock and thin wall tubing, pipe, conduit, cable, rolled forms, etc.

Write for catalog and name of dealer



Cutting small diameter brass tubing, using wood block false jaws.



Making a square cut on solid 3" steel bar.



*T.M. Reg. U.S. Pat. Off.

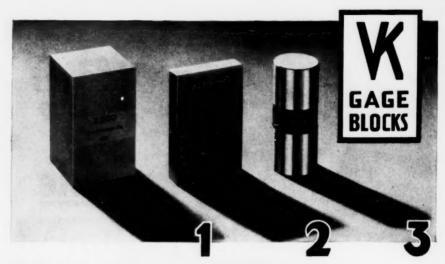
Cipe - ROLLWAY CORPORATION

Manufacturers of Automotive Clutches and Machine Tools 814 Emerson Ave., Syracuse 1, N. Y

May, 1954

MODERN MACHINE SHOP

71



THREE WAYS to protect production accuracy

To meet closest limits of accuracy and protect production, Van Keuren is currently furnishing three types of gage blocks:

- 1 SOLID SQUARE MASTER BLOCKS
- 2 RECTANGULAR REFERENCE GAGES
- 3 MICROGAGES

Shipment on complete sets of any of these three types can be made within 60 days from receipt of order.

VK Solid Square Master Blocks are accurate to .000004" per inch of length and are designed for laboratory use or to standardize all shop dimensions. Large wearing surface; perfect parallelism. Available in 85- and 41-block sets and guaranteed unconditionally for 5 years not to exceed .0001" in wear.

VK Rectangular Reference Gages are guaranteed accurate to .000008" per inch of length and are designed for the inspection department or precision set up work. They are available in 81-block and 33-block sets. Individual

blocks from either of these sets can also be furnished. Certificate of size is also furnished with each set.

VK Microgages are accurate to plus .000012", minus .000008" per inch of length and are designed as working gages for shop use . . . to put accuracy at the machine. Wearing surface is 40% greater than that of rectangular gage blocks hence their long-wearing quality. Available in several set combinations.

Van Keuren Gage Blocks are fully described in Catalog and Handbook No. 35, yours for the asking by writing: The Van Keuren Co., 175 Waltham St., Watertown, Mass.

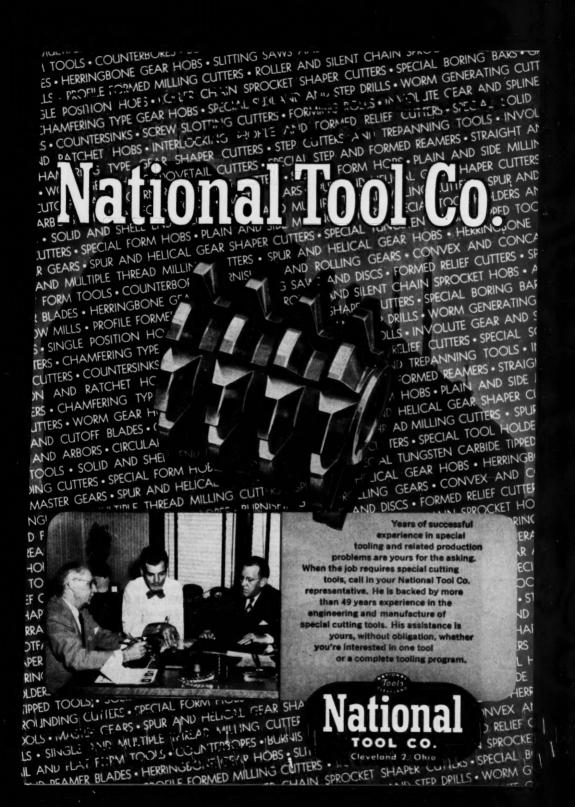


THE Van Keuren co.

175 WALTHAM STREET, WATERTOWN, MASS

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Tope Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Threat Measuring Wires • Gear Measuring System • Shap Triangles • Carbalo Communication Plug Gages • Carboloy Commented Carbide Measuring Wire • Chromo Carbide Taper Insert Plug Gages





EXCEL No. 6 PAYS BOTH WAYS

TOOL & CUTTER
GRINDING
HEADQUARTERS
in the smaller shop-

EXTRA SHARPENING SERVICE in the larger plant—

An outstanding value in price and performance! The Excel No. 6 Universal Cutter and Tool Grinder will accurately sharpen reamers and milling cutters in a wide variety of shapes and sizes. A full line of attachments is available for a multitude of applications including cylindrical and internal grinding. Base optional.

Swings work 8" dia x 16" long
Face mill capacity 12" dia.
Table surface 4" x 24"

See Covel machine: in operation R. O. DEADERICK CO. SHOW Atlanta Biltmore, Atlanta, Ga., May 19, 20, 21.

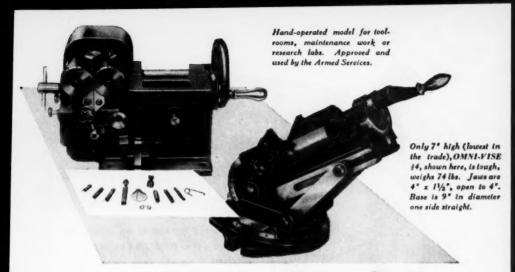
OVEL
PRECISION
GRINDERS
BENTON HARBOR — MICHIGAN

Builders of Precision

Grinders for 79

DRILL
GRINDERS
CUTTER &
TOOL GRINDERS
HYDRAULIC & HAND
FEED SURFACE GRINDERS

Write for BULLETIN E-54



new slant on shop profits!

When you need a replacement or experimental pring, any shape, diameter or pitch from flat or ound wire sizes .005" to .125", you can produce it n a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of

arbors, yet turn out precision springs - torsion, compression, extension tapered, or special springs - coiled either left or right hand, in any desired length, any diameter from 1/6" to 12" and larger, with or without initial tension, and with open or closed Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or Power model for



continuous runs, on welded steel console base.

them fast right in your own shop! **EXCLUSIVE DISTRIBUTORS OF** PRECISION MACHINE TOOLS

Connors and Davis Sales Corporation

> CIRCUIT AVENUE WEST SPRINGFIELD, MASS.

experimental work. Make



Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only

7" high (lowest in the trade), OMNI-VISE #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x 11/2", open to 4". Base is 9" in diameter with one side straight. Inset shows OMNI-VISE #2, a precision, low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, 43/4". Jaws, 21/8". Opening, 21/8". Base, 71/4" x 5". For grinding, drilling or general work at any angle, by hand or machine, an OMNI-VISE is the machinist's choice.

CONNORS AND DAVIS	Sales Corporation
405 Circuit Avenue, West S	pringfield, Mass.
Please send detailed informa	ation and prices on:
PERKINS SPRING	COILER
ha	and D power D
OMNI-VISE	#4 🗆 #2 🗖
Name	Title
Company	
Address	
City	State



Yes, simply by changing stamping methods, this NILSON Customer profited 4 ways:

- 1. Production increased 80%.
- 2.72% less metal used (per 4 million pieces).
- 3. Greatly improved quality with minimum of rejects.
- Strengthened competitive position with greater profit margin.

You, too, can enjoy these advantages in producing your own wire forms and small metal stampings. Parts such as illustrated in the margin were straightened, fed, pierced, blanked, swaged, stamped or coined, cut-off and formed AUTOMATICALLY in NILSON 4 SLIDES in one quick precise operation. ONE Machine. ONE Operator.

NILSON 4 SLIDES available in wide range of sizes: forming Wire up to ½" diam, in feeds to 32" max, and Metal Ribbon stock up to 3½" wide. Press sections 5 to 30 ton capacity. Heavy Duty Types in 50 and 75 ton models.





Tests Prove That CIMCOOL With "95-16" Doubles Rust-Control

This is no "blue-sky claim"! Actual scientific laboratory and shop tests prove that Cimcool." with "95-16" doubles rust-control compared with a formula without this amazing ingredient.

But doubling rust-control is just one of many reasons why more and more plants are switching to CIMCOOL. This radically new and different coolant—this chemical emulsion—saves you money many important ways. Plant after plant reports that CIMCOOL covers 85% of all metal cutting jobs... and does a better job. It permits faster speeds because it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned

coolants. It's longer lasting in machines. So Cimcool reduces downtime and cuts labor costs for cleaning and changing.

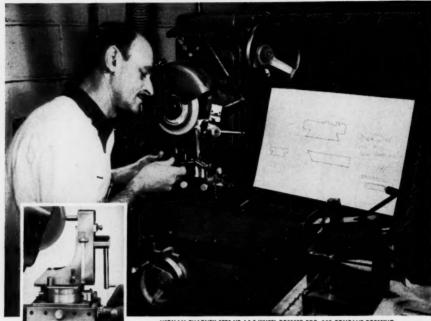
Let us prove to you what scientific tests and on-the-job experience have already proved. Put CIMCOOL to the test in your own plant—on your own machines. For a demonstration write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL

for 85% of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



HERMAN CHARNEY SETS UP J & S WHEEL DRESSER FOR .OSD CONCAVE DRESSING

Saves hours by setting angles in seconds, radii in minutes

A typical job made easier with a J & S "Fluidmotion" Wheel Dresser

Here's a wheel dressing job which calls for 13 angles, 4 radii, 7 flats. Ordinarily you might expect to spend from 5 to 30 minutes for each setting. With a J & S "Fluidmotion" Wheel Dresser, tool grinder Herman Charney made all 24 settings in just 21 minutes.

Time-saving Features

An unusual case? No - it's typical of the speed and ease of operating a J & S Wheel Dresser. Setting 2 angles with a "Fluidmotion" Dresser, for example, takes only 10 seconds. Setting a radius takes only 2-3

Note just how easy it is to operate a J & S Wheel Dresser. All you need is a micrometer and a simple hex wrench. You can forget about gage blocks, height gages and master gage settings. No need to bother either with parallel bars, surface plates or dial indicators.

With the "Fluidmotion" Dresser, you can also dress two angles tangent to a radius in one continuous motion. After dressing the angles, the diamond automatically returns to center.

Accurate to 0.0001"

Accuracy? You can make concave and convex contours at a full 180 degrees with a guaranteed accuracy of 0.0001". J & S dressed forms, too, are always clean and precise. Angles and radii flow into each other, free of tool or chatter marks.

These are some of the benefits you get when you use a J & S "Fluidmotion" Wheel Dresser. A variety of models are available for dressing wheels up to 24" in diameter. Construction in all cases is of high-carbon, high-chrome steels.

Write for complete information today



WHEEL DRESSERS . JAW CLAMPS . PRECISION VISES . SINE BARS . DOWN-HOLDING DEVICES

645 W. MT. PLEASANT AVENUE, LIVINGSTON, NEW JERSEY

SIDNEY

FLUID TRACER AT WORK in the plant of

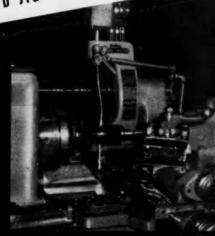
THE FOSDICK MACHINE TOOL CO. CINCINNATI MANUFACTURERS OF RADIAL-SENSITIVE-UPRIGHT DRILLS

AND JIG BORERS

Here's what Fosdick thinks about Sidney Lathes:

"This Sidney Lathe with tracer attachment has been very satisfactory, resulting in considerably reduced production time and, at the same time, holding closer tolerances."

Note how simply and economically the SIDNEY FLUID TRACER reproduces any type of work in any quantities



THE TRACER HEAD FOLLOWS ALONG A TEMPLATE OR MAS-TERPIECE AND THE WORK IS DONE WITH ACCURACY OF UT-MOST FIDELITY ... QUICKLY.



A survey reveals that 55 per cent of machines in most plants are 10 years old or older. More than 1,000,000 tools are in this obsolete class. Replace your obsolete turning-equipment with MODERN SIDNEY LATHES

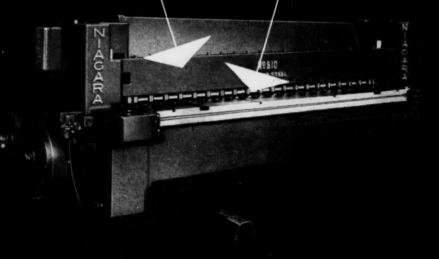
WRITE FOR BULLETINS



THE SIDNEY MACHINE TOOL CO. . SIDNEY, OHIO

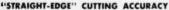
Builders of Precision Machinery since 1904

SELF-COMPENSATING HOLDDOWN



NIAGARA MACHINI A 1001 WORKS America's most complete line of presses, shears, machines and tools for plate and sheet metal work

a BIG FACTOR in the superiority of Niagara Shears



Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY

Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN

Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With *less* to go wrong, there is *less* to repair and replace.

HOLDS WORK FLAT AND STATIONARY

Multiple pressure feet on 6" centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

HANDLES STOCK OF VARYING THICKNESS

Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses . . . even at the same time.

NIAGARA MACHINE & TOOL WORKS . BUFFALO 11, N.Y.

DISTRICT OFFICES: Detroit . Cleveland . New York . Philadelphia

Dealers in principal U. S. cities and major foreign countries



In a power squaring shear, no single feature nor component can be fully responsible for accuracy, speed and economy. They result from a combination of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held crosshead guides; multiple point sleeve clutch—the very features that have established the marked superiority of Niagara's Underdrive Series.

For the whole story, straightforwardly presented, on America's most complete

line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request Niagara Bulletin 69. Write today.





UNDERDRIVE SQUARING SHEARS



VALVES

BY-PASS, OIL-RELIEF
PISTON TYPE,
HYDRAULIC



NON-CHATTERING

because the cylindrical piston closes off the port in a shearing manner . . . and does not seat abruptly against the body of the valve.

EXTREMELY SIMPLE

Just select pressure desired from 5 springs ... INSTALL ... NO FURTHER ATTENTION NEEDED.

FOR machine tool hydraulic mechanism, oil-burning equipment, rams, presses and Diesel engines.

Pressures: 0 to 500 lbs. Pipe sizes: ¼" to 2" Bodies: cast iron or brass. Pistons: brass, hardened or stainless steel.

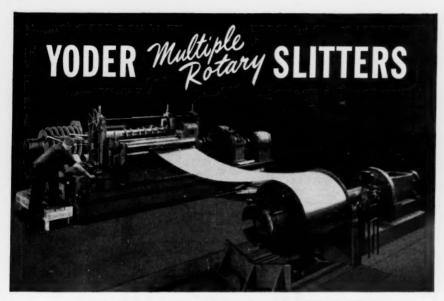


WRITE—on your letterhead, please
—for personal copy of
FULFLO MECHANICAL DATA BOOK.
Specify if for Valves, for Pumps or
for both.



THE FULFLO SPECIALTIES CO. Inc.

PUMP AND VALVE MANUFACTURERS BLANCHESTER, OHIO



pay Four Kinds of Dividends!

If you use 100 tons or more of coiled strip or sheets per month, in special widths, the installation of a Yoder Slitter will pay four kinds of dividends:

- Savings of \$10 to \$30 per ton by buying standard widths instead of slit strands. This saving alone often pays for the Slitter investment in a year or less.
- 2. You can buy standard widths competitively, wherever you can obtain the best quality, price and delivery.
- Greatly reduced inventory requirements. From a relatively small stock of standard widths you can meet your own needs for special widths in a few hours,
- Better control of production schedules since slitting service no longer is a problem.

Yoder slitters, uncoilers, recoilers and other accessories are made in many sizes and capacities, from the smallest to the largest. The Yoder Slitter Book is a treatise on the economics as well as mechanics of slitter operation—send for it.

THE YODER COMPANY • 5532 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- * COLD-ROLL-FORMING and auxiliary machinery
- * GANG SLITTING LINES for Coils and Sheets

DIRE and TURE MILES-cold faming and welding



KRW is the Best Hydraulic Press You Can Buy!

Let's take one apart and prove it!



KRW Customers, which includes almost every nationally known company in the United States and Canada, tell us that KRW Presses are the best buy! They have proved it to themselves in day after day, year after year satisfactory performance. Now we want to prove to you why these customers are so right.

RAPID APPROACH OF RAM
FILLS CYLINDER WITH OIL



The ram is quickly brought down to the work by rotating the "Copstan" handwheel. As the ram descends to the work the cylinder is automatically filled with oil. A flight the ball arm closes the valve, and the first pumping stroke gives tons of pressure on the work.

WELDED
TRUSS REINFORCEMENT



The heavy steel bed and crown plates on KRW presses have a special welded truss reinforcement to give them added strength and rigidity with minimum weight. This feature minimizes deflection.

MACHINED ALL-STEEL V-BLOCKS



KRW oll-steel V-blocks (furnished with the press) have mochined shoulders which slide on the machined top surfaces of the bed members. This means you can slide the V-blocks along the bed to make quick set-ups and they're always in alignment. You get solid, rigid, accurate support. No danger of V-blocks tipping or falling between the bed members.

5 CONVENIENT LOCATION OF HYDRAULIC PUMP HANDLE



The KRW pump handle is slightly below waist level, a natural, comfortable position which enables the operator to work for long periods of time without fatigue. He can exert whatever strength necessary easily and efficiently. It's a man-saving feature that results in better, more accurate work and greater production.

3 BUILT-IN MECHANICAL PRESS



Spinning the "Capston" handwheel rotates a pinion which engages a rack cut in the ram. The sliding handles in the handwheel can be extended to increase leverage to give a ram pressure of 3 fans. This "builini" mechanical arbor press gives the operator the advantage of the large bed and its adjustability. It permits the use of the V-blocks when necessary. If more than 3 tons pressure is required close the volve and a few pumping strokes give the needed hydraulic pressure without moving the work from the bed.

COMPLETE

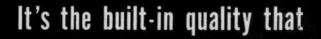
KRW makes a complete line of one, two and three cylinder Hydraulic presses, 25 to 150 ton capacities; hand operated, air operated or operated your needs. We'll send you facts, specifications and prices without obligation.



K-R-WILSON

2-15 Main Street, Buffalo 3, N.Y.

Designers and Builders of the Right Hydraulic Press to Solve Your Metal-working Problems



counts

COLUMN OR BENCH TYPE SPEEDS UP TO 12000 R. P. M. 12" SWING

A HIGH CLASS TOOL to meet the requirements for *Precision* and *Production Drilling*. CAPACITY—From very small number size drills up to ½" in cast iron.

Built-in Work Light on all spindles.

Telescopic Spindle Guard.

Rack and Pinion operated Motor plate—easily adjustable for proper belt tension and speed changes.

Clock Spring fast acting spindle return.

Write for Bulletin

THE AVEY DRILLING MACHINE CO., Cincinnati 1, Ohio



CUTTING. New S.E.C.O. keeps parts and tools cooler. Tools last longer, require fewer grindings; production is increased; finishes are uniformly good.

Now Better Than Ever! Sunoco Emulsifying Cutting Oil

New refining facilities improve industry's most widely used cutting oil and permit it to give these added benefits

- HIGHER MACHINING EFFICIENCY—better finishes, longer tool life, increased production in cutting operations
- INCREASED DETERGENCY—particularly important in grinding operations—provides better surface finishes, prevents loading and glazing of the wheel, prolongs wheel life
- BETTER MIXING QUALITIES—in hot, cold or hard water
- A PURER, CLEANER CUTTING OIL—whiter, more stable emulsions; cleaner parts and machines; better operator acceptance
- EASIER HANDLING—pumps from storage tanks more readily, flows from drums faster
- GREATER VERSATILITY—can be used for rolling, washing and rustproofing as well as cutting and grinding





MIXES IN HOT WATER

This new S.E.C.O. mixes and remains stable even at 180 F., permitting its use in washing and rustproofing.

MIXES IN COLD WATER

New S.E.C.O. forms stable emulsions in the coldest water . . . even ice water does not affect it.

MIXES IN HARD WATER

New S.E.C.O. eliminates the need for special hardwater grades of emulsifying cutting oil.







GRINDING. New S.E.C.O. improves surface finishes because its increased detergency prevents loading and glazing of grinding wheels, prolongs wheel life.

RUSTPROOFING. New S.E.C.O. is a better hot rust-proofing medium. It forms stable emulsions, coats metal parts uniformly, protects them against rusting.

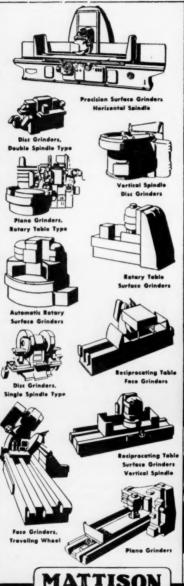
WASHING. Because of its increased detergency and its ability to mix and remain stable in hot water, New S.E.C.O. is better for removing grease and dirt.

TEST THIS NEW S.E.C.O. IN YOUR OWN PLANT. For more information, call your nearest Sun office or write Sun Oil Company, Phila. 3, Pa., Dept. MM-5.

SUN OIL COMPANY



PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL Made by the producers of famous Blue Stroco Gasoline and Dynalube Motor Oils



MATTISON Grinders

If its a Flat Surface to Grind There's a Mattison to Grind it.

With the addition of the production grinding machinery formerly made by the Hanchett Manufacturing Company, Mattison now is in a position to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work. Experienced fixture engineers are available to give you best production efficiency with Mattison Machines.

For any flat grinding, ask for our recommendations on the proper method and machine for your job. No obligation, of course.

For catalog on all machines, ask for free copy of general bulletin.



40 hours before — now 4 hours. Pump case ground on Mattieon Horzonial Spindle Pre-



320 surfaces of cast iron compression heads per hour, removing 1/32" stock with Mattison



900 connecting rods per hour, using 40 station fixture to finish grind crank and wrist pin and of assembled rod with Mattieon No. 72 Grinder



Shows variety of work run on Mattiser Face Grindurs

MACHINE WORKS

Linked TOGETHER FOR MAXIMUM PRODUCTION





ROLL-O-MARK

Multi-Purpose
All-Pneumatic
MARKING MACHINE

Whatever your needs for metal marking, Noblewest makes the machines, marking dies, and work-holding fixtures for doing the complete job faster, better, at lower cost. And remember, Noblewest Roll-Marking is permanent marking—good for the life of your product. Write Noble & Westbrook Manufacturing Company, 25 Westbrook Street, East Hartford 8, Conn.





...In that year the Boyé & Emmes design featured a single back gear, which doubled the number of spindle speeds previously considered adequate.

oday BOYE & EMMES LONG LIFE ENGINE LATHES

incorporate the accumulated know-how of fifty-nine consecutive years of exclusive engine lathe manufacture.



BOYE & EMMES

MACHINE TOOL COMPANY
123 CALDWELL DRIVE
CINCINNATI 16, OHIO
MACHINE TOOL CENTER of the WORLD

For full information about Boye & Emmes extended range of spindle speeds and other modern design changes write for FREE Bulletin 5305. Ask also for our new folder "Fifty-Nine Years of Enginn Lathe Evolution,"





Whatever your requirements may be — there is a Challenge work bench to meet your needs. Each has a durable cast-iron top two inches thick — will not warp, shrink, splinter or burn. And every one has leveling screws to insure a perfectly level and accurate surface. Legs are strong and solidly braced.



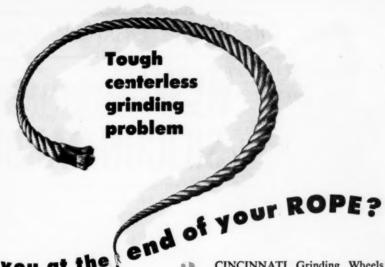
A COMPLETE RANGE OF SIZES AND STYLES

Three styles as shown . . . Four sizes: (top dimensions) 28x48 and 28x60 with four legs; 28x72 and 28x84 with six legs. Write for details and prices.



THE CHALLENGE MACHINERY COMPANY

Office, Factories and Show Room: GRAND HAVEN, MICHIGAN



got you at t

Here's the grinding wheel that will ABSOLUTELY solve it!

. . . because CINCINNATI Grinding Wheels are made to team-up with centerless grinders. And, with a Cincinnati Milling trained machinist on the spot to help, you can count on the right answer-FAST! Here's why:

We've solved hundreds of centerless grinding problems involving high stock removal, good finish, accurate sizing, and high production per dressing, by using the right CINCINNATI Wheels.

CINCINNATI Grinding Wheels were developed by Cincinnati Milling, which in the field of centerless grinders has done more research, had more experience and made more machines than any other organization in the world.

CINCINNATI Grinding Wheels are based on an entirely new approach to grinding wheels, the development of the grinding wheel as a true cutting tool, and they represent twentyfive years of Cincinnati Milling research and practical experience.

We are so confident-so absolutely sure-that CINCINNATI Grinding Wheels can help solve your tough centerless grinding problem that we make this unconditional offer: either you must be completely satisfied, or we will issue full credit for the CINCINNATI Grinding Wheel used.

So contact us at once. We'll send one of our expert machinists. He can show you how to get the most out of CINCINNATI Grinding Wheels. There is no charge for his service. Write, wire or phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.





NEW! Brightboy SILICON CARBIDE

Beat increasing competition with Brightboy's broader, better methods that really count — with finer, faster BURRING, CLEANING, FINISHING, POLISHING, IN ONE OPERATION! Achieve finishing time savings up to 50%!

NOW, wherever requirements dictate, you have available a new rubber-cushioned Brightboy compounded with silicon carbide abrasives for countless time-saving applications. This new Brightboy

grouping is our answer to the growing demand from finishing experts who appreciate and want Brightboy textures which incorporate the working characteristics of silicon carbides. Accordingly

THE COMPLETE BRIGHTBOY LINE IS NOW COMPOUNDED WITH EITHER ALUMINUM OXIDE OR SILICON CARBIDE GRAIN

AND—Brightboy is now available in a wide variety of grain sizes ranging from extra coarse to extra fine, in soft, firm and tough rubber binders.

Thus Brighboy widens your finishing horizon almost unbelievably . . . cuts your finishing time costs substantially! Rubber-cushioning renders the complete Brightboy line extensive in its adaptability—creates time-and-work-saving applications far beyond the limits of other finishing methods:



TRY A TEST! Get complete details, and the Brightboy Catalog-Manual from your dealer. Write us on any problem where finishing is involved.



BRIGHTBOY INDUSTRIAL DIVISION WELDON ROBERTS RUBBER CO.

95 No. 13th St. . Newark 7, N. J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

FOR FINISHING ALL METALS,
PLASTICS, AND LAMINATED MATERIALS



If you're using obsolete, slow-poke methods of shearing, the Kling Double Angle Shear can help you save time and money. This modern compact machine is designed for high speed, high production shearing on both long and short run jobs. Many metal fabricating plants and steel warehouses have found the Kling Shear to be the workhorse of the shop. For instance, one machine will shear round bars and bar angles on the left side while the right side can be used for structural angles and flat bars. The machine is built with the speed and power to handle the bulk of your shearing requirements. For shops with considerable mitre shearing work, Kling Double Angle Shears can be mounted on a turntable to facilitate handling. Automatic hold downs and one-shot lubrication can be furnished when desired. Sizes to handle angles up to 8" x 8" x 11/2"

WANT TO CUT SHEARING COSTS?

Find out how this high-production machine, available in four sizes, can give you more cuts, cleaner cuts on, your shearing operations. Write for more information and latest bulletin. Kling Bros. Engineering Works, 1320 North Kostner Avenue, Chicago 51, Illinois.

SEND FOR NEW BULLETIN 2345









un investment in speed!





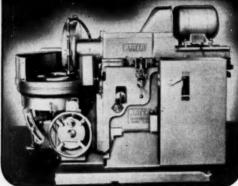




The Arter Family of Machines



CARBIDE TOOL GRINDERS



ROTARY SURFACE GRINDERS

CYLINDRICAL GRINDERS

INTERNAL GRINDERS

The Arter trademark on these machines is the sign of ACCURACY • POWER • DEPENDABILITY. Tell our engineers your grinding problems. They'll find a way to lick them.

ARTER GRINDING MACHINE COMPANY
WORCESTER MASSACHUSETTS

Agents in industrial centers of United States and Canada



Clean design and rugged construction make Gilberts pay high returns on your investment. Quick response to controls, with minimum effort, plus positive "no-drift" clamping, help Gilbert operators get more work done accurately and faster. 9" and 11" columns. Thirty-day delivery. Ask your Gilbert representative to demonstrate why "those who buy Gilbert buy Gilbert again," or write for Bulletin 349.



JIG GRINDING ACCURACY guaranteed*

EASILY CONNECT

this jig grinder to jig borer or mill (The "Vulcanaire" has infinite controlled speeds 30,000 to 65,000 R. P. M.)

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs. *Dependably accurate to ''tenths''



Then you can finish grind in hardened steel to "tenths"...
jig grind dowel holes square with a ground base... move
location of holes in hardened steel blocks... jig grind interchangeable holes in hardened sections... grind small holes
with diamond impregnated mandrels... grind contours and
relief with tungsten carbide burrs... grind radii in die
sections... eliminate jig bushings in tools where close spacing
is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 1/4 1/10 long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

MAJOR VULCAN SERVICES

Engineering, Processing, Designing and Building, Special Tools, Dies, Special Machines including the Vulcan Hydraulics that Form, Pierce, Assemble and Size.

VULCAN TOOL CO. • PRITZ AND HIGHLAND • DAYTON 10, OHIO

13 LEHMANN Engine Lathes NOW at work in U. S. Steel's New Fairless Works...



The largest integrated steel mill to be built at one time uses LEHMANN Lathes in its modern maintenance shops!

The Fairless Works, built on 3,900 acres and one of the biggest expansion projects built in our time, incorporates the most modern steel mill equipment available. One of the big jobs at Fairless is that of maintenance. Special shops to keep all the equipment used in this 2.2 million ton plant in top running order are an important part of Fairless.

The machine tools, cranes and other equipment necessary for cleaning, machining and repairing the mill operating equipment (which, in fact, make practically all repairs required at Fairless) include 13 Lehmann engine lathes! Some of these lathes are shown in the above photo.

Find out how Lehmann Lathes can bring efficiency, safety and speed to the operations in your plant. Write today for information or catalog — or — send prints for time and money saving recommendation.



DIVISION OF NOVO ENGINE CO.





Tannewitz HIGH SPEED BAND SAWS

MEANS OF CUTTING METAL AND MANY OTHER MATERIALS

There's a revelation in store for you if you have never tried friction sawing with these machines. Flat sheets of either soft or hardened steels, non-ferrous materials can be sawn in a fraction of the time required by other methods. Cutting armor plate and other materials is not impractical, and for cutting formed parts there's nothing that compares with it. Cuts are smooth and down-drag of saw is so minor that no rest of any kind is needed. Write for your free copy of "FRICTION SAWING", Now!

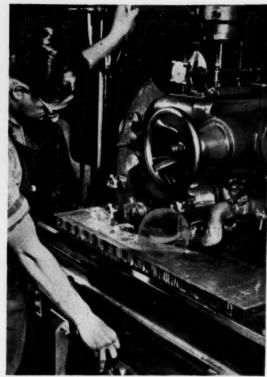


GL-6-1729

For trimming castings of all types of metals our variable speed band saws are real production expediters. Write for bulletin.

SAWING MACHINERY SPECIALISTS

he TANNEWITZ WORKS



"The new G Bond ALUNDUM" wheels give us double the production of former standard wheels." That's how a Massachusetts manufacturer sums up the performance of the new Norton wheels in grinding hardened high-speed steel testile blades. He adds: "Wheels used on this job must be very free and cool cutting to avoid warping and burning the very thin stock."



"I get a fast cut and good finish. They're the best and most versatile segments I ever used for this kind of work and I'm re-ordering ten sets," reports an Illinois customer using G-Bond segments for surface grinding mild steel, cast iron and Meehanite —all three



Waking better products . . , to make other products better

These users say:

For surface grinding, the new G BOND beats them all!

Latest Norton wheels bring you the money-saving "TOUCH of GOLD"

Naturally, we've kept close watch on how the new G Bond wheels are doing. And we can report that throughout the range of precision and semi-precision grinding applications they're already away out in front. In the field of surface grinding, for instance, a composite statement by users of the new G Bond would run very much like this:

"G Bond wheels cut freer, cooler, faster — enabling us to take heavier cuts in costly high speed steels without drawing temper. They give us closer tolerances and smoother finishes. They dress easier and produce more pieces per dressing. Doing more work and a greater variety of work — per wheel, they outlast any wheels we ever used before."

G Bond Wheels for YOUR Surface Grinding

will bring new speed and economy to surface grinding jobs — thanks to their unique grainholding structure that produces greatly improved cutting action. Remember, the G Bond is the most modern, most efficient vitrified bond ever developed — a typical Norton "Touch of Gold" achievement that steps up grinding performance and product quality while cutting grinding costs.

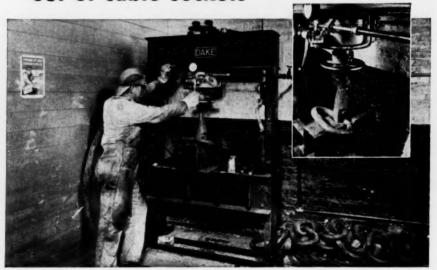
See Your Norton Distributor

for the ALUNDUM G Bond wheels, cylinders and segments you need. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. Export: Norton Behr-Manning Overseas Inc., Worcester 6, Mass.

*Trade-Mark Roy. U. S. Pat. Off. and Fareign Countries

A DAKE PRESS replaces

the "hernia method" of driving plugs out of cable sockets



concern that supplies cable slings for steel mills re-uses the closed-type sockets after driving out the cable-and-solder plugs.

Knocking them out was formerly a "brutal" job for two men. One held a driving pin, while the other swung powerful blows with a sledge. Working full time, they couldn't keep up with production requirements, and it was difficult to keep men for such hard manual labor.

Today, one man handles the entire job easily with a Dake Press, in 16 to 20 hours a week. Labor cost is less than 25%, and workers are mighty glad that the rugged hand sledging days are over.

Are you using Dake Presses for the hard jobs in your shop? Dake Catalog 129 shows many standard arbor and hydraulic presses...or, if you have a special problem, Dake can custom engineer a press to your particular needs. Why not ask?

Dake Engine Company, 612 Monroe St., Grand Haven, Mich.















DUPLICATE FORM MACHINING DIRECT TRANSFER · NO INTERMEDIATE MOTION with ROCKFORD KOPY-KAT duplicator





Inaccuracies are eliminated in duplicate form machining with Rockford Kopy-Kat Duplicators due to the absence of intermediate motion. Here, a Kopy-Kat Duplicator is shown reproducing a three-dimensional form, transferring the form directly to the cutting tool on a Rockford Openside Shaper. The hydraulic duplicator valve is so sensitive, so exact, that positive duplication of complex forms is done with the ease of straight-production

A Rockford Machine Tool Co. Representative will show you how Kopy-Kat duplicating simplifies your formmachining problems. Get the full details from him, with examples on many varied and complex forms and shapes.

machining.

ROCKFORD MACHINE TOOL CO. 2500 KISHWAUKEE STREET, ROCKFORD, ILLINOIS



Builds the BEST Quality at the BEST Price

1/4 H.P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1½" to 3". %" end mill capacity.

\$24500



1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.

34" end mill capacity.
For vertical, horizontal and angular operations.

1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

34" end mill capacity.

For vertical, horizontal and angular operations.



RUSNOK TOOL WORKS

4840 West North Ave., Chicago 39, III. DEALERS IN ALL PRINCIPAL CITIES

MILLING . DRILLING . BORING

NOW

a quick, low-cost way to "tool-up" for bigger production



gives more efficient application of cutting oils for

- higher cutting speeds
 faster rate of feed
- longer tool life lower unit production costs

on tapping machines, drill presses, milling machines, grinders, lathes, boring machines, high-speed saws, stamping presses, deep draw presses.

PIONEER AND LEADER IN OIL FOG LUBRICATION FOR 26 YEARS

VALVES O FILTERS O HOSE ASSEMBLIES
 REGULATORS O LUBRICATORS





Coolant where you need it... spray is applied to work area from any required direction to thoroughly lubricate critical areas of centers between cutting tool and work piece.



A Drop o Coolant



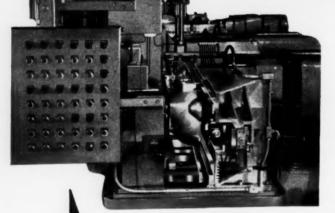
A Drop of Coolent

Fine spray rapidly dissipates heat...the spray lubricates tool more efficiently, has greater exposed oil surface area for fast, thorough dissipation of heat.

WRITE FOR COMPLETE DATA-NEW FOLDER No. 491



for Drilling, Chamfering, Boring and Tapping



MICHIGAN

Shown is Four Double End Machine with a transfer System moving Torque Converter Housing automatically through the machine. In addition the part is laid on a roller conveyor after all the machining operations are completed. Machine is designed in such a manner that additional stations can be added at any time. The part, when placed in the transfer track, makes a limit switch and the cycle is automatic.

WE SOLICIT YOUR INQUIRY AS TO ANY SPECIAL DRILLING, MILLING OR BORING OPERATIONS YOU MAY HAVE



ICHIGAN DRILL HEAD CO.

971 E. EIGHT-MILE ROAD

HAZEL PARK, MICH.

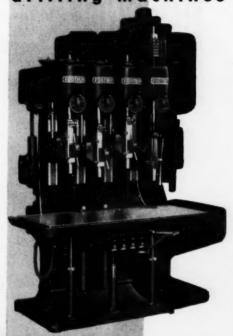
FOOTBURT

A FULL RANGE DRILLING MACHINE ENGINEERED FOR PRODUCTION

Built carefully to provide the required accuracy for fine tool room work, Footburt Sensitives are designed with the weight and stability to maintain close tolerances on day after day production work. The correct speed for a wide range of drilling, reaming, and counterboring operations is instantly available. Write for full information on this great line of Sensitive Drilling Machines. Built in 1, 2, 3, 4, 6 Spindle Models.

THE FOOTE-BURT COMPANY Cleveland 8, Ohio

Detroit Office: General Motors Building





No. 2 Machine with Back Gear • 12" Overhang • 54" Drilling Capacity in Steel • Optional Speed Ranges • 185 to 2300 RPM • 280 to 3450 RPM • Vertical Motor Drive with Standard Single Speed Motor • Power Feed Assembly • Tapping Attachment • Coolant Outfit.

engineered for production FOOTBURT

HARDINGE COLLETS and FEED FINGERS

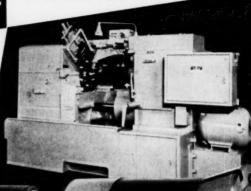
for NEW BRITAIN Automatics*



Assure Maximum Production at Lowest Cost

Reduce tooling costs and step up production on your New Britain Automatics with HARDINGE customer shop-proved collets and feed fingers.

> * Also available for the following outomatics: Cone, Greenlee, Gridley and Acme-Gridley, National Acme.



HARDINGE Style "B" Master Feed Finger

HARDINGE Style "S" Master Collet







Stock Delivery

HARDINGE Regular Feed Finger

Choose for your requirements:

Hardinge Master Collets and Feed Fingers . . .

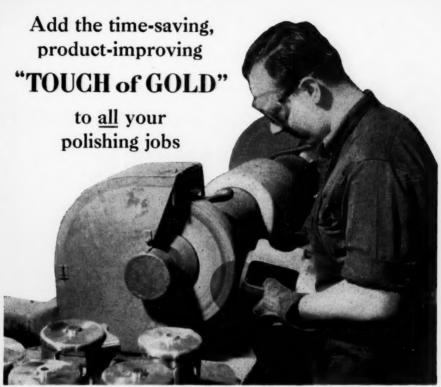
The only master collet with no work pressure on the screw. Pads are completely interchangeable

among machines of similar capacity.

Hardinge Regular Collets and Feed Fingers . . . Precision made, hardened and ground internally and externally.

One source of supply for all collets and feed fingers.

HARDINGE BROTHERS, INC., ELMIRA, N.Y.



Marine Equipment Parts get the value-adding "Touch of Gold" when polished with Norton ALUNDUM* abrasive

When you standardize on Norton ALUN-DUM abrasive, every polishing job you do gets off to a better start — and finish!

One reason is because the grains in this Norton-developed abrasive are thoroughly uniform in size, structure and chemical composition. Which means thoroughly uniform polishing, with no oversized grains to mar surfaces, and no flats, slivers or undersized grains to loaf on the job. And you get fast polishing, too, because ALUNDUM abrasive is famous for rapid, clean-cutting action.

Another reason is that ALUNDUM is specially processed to give it high capillarity. With all grains soaking up cement or glue uniformly and adequately, each grain is held firmly — assuring long-lasting, top-performing polishing wheels.

These Advantages In YOUR Polishing mean better-finished, better-looking prod-

ucts in less time and for less money — the sure "Touch of Gold" you can add to all your set-ups, manual or automatic.

Your Norton Distributor

can supply you promptly with ALUNDUM polishing abrasive in the types, sizes and surface treatments you need. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed in your phone directory yellow pages under "Grinding Wheels". Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.



Making better products... to make other products better
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



Automatic Roll Feeds



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and

easily adjusted to meet individual job requirements.

WITTEK Reel Stands

Simplify Handling of Coiled Stock

A choice of standard models is available to facilitate handling a large variety of coiled stock...from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

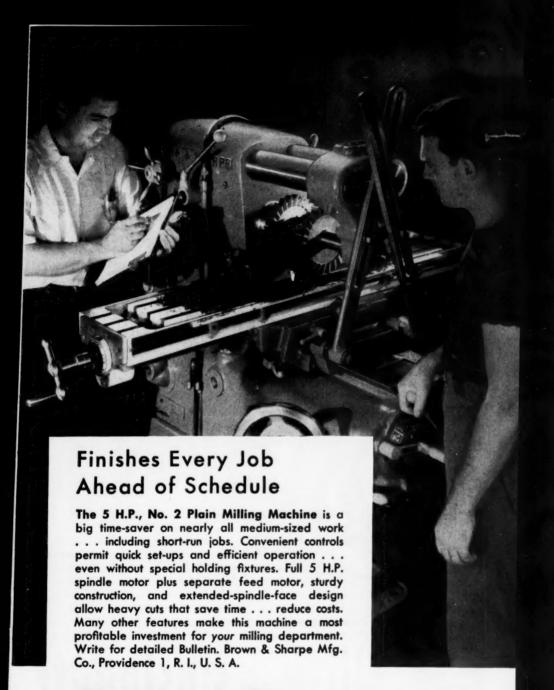
Write for full particulars

WITTEK Manufacturing Co.

4322 W. 24th Place, Chicago 23, Illinois

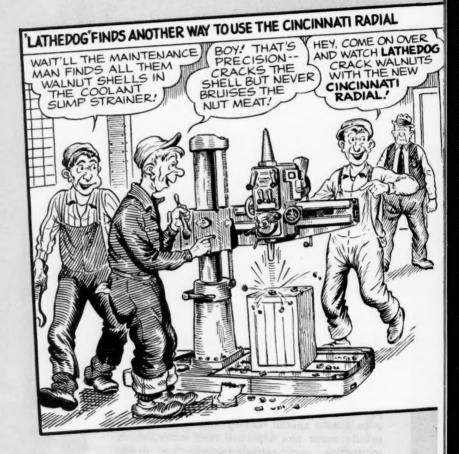


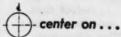
Automatic
ROLL FEEDS AND
REEL STANDS



Brown & Sharpe BS





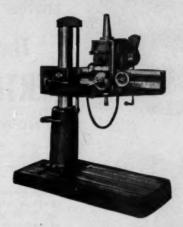


cincinnati

R.WILLIAMS HERE COMES THE BOSS. THIS'LL BE BETTER THAN LAST WEEK WHEN HE CAUGHT ATHEDOG WITH A SPOON IN HIS SPINDLE STIRRINGHIS COFFEE AT 2420 R.P.M.

Large-size prints of this J. R. Williams cartoon are available.

r. 1953 by NEA Service, I



A Cincinnati 3'7" Radial is versatile enough to do the vast majority of the jobs in an average shop. Its 1" capacity will handle almost every drilling need. It costs far less than high-priced radials, yet it has high-priced features.

- 1. Unit construction throughout
- 2. Simple direct drive
- 3. All-geared head—automatically lubricated 4. 9 spindle speeds in geometric progression
- 5. Self-contained feed transmission
- 6. 6 spindle power feeds
- 7. All speed and feed gears hardened steel 8. All shafts on antifriction bearings
- 9. Ground tubular steel column mounted on antifriction bearings
- 10. Multiple-disc clutches for spindle drive
- 11. Reverse spindle speed—twice forward speed for tapping
- 12. Hardened and ground headrail on arm

Also available, a complete line of engine, toolroom and gap-bed lathes and a complete line of floor and bench-type drilling machines.

For complete catalogs, prices and name of your local dealer, write on company letterhead to Cincinnati Lathe & Tool Co., 3262 Disney, Cincinnati 9, Ohio.

lathes and dril



versatility accuracy economy



another great new PLUS...

The CLAUSING VERTICAL MILLER

is NOW READY FOR YOU!

The new Clausing Vertical Milling Machine has more Plus Value features than have ever before been available in a miller at or near its price!

It has Versatility Plus! It is actually several machines combined in one. The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill, drill, bore, ream and shape at all angles, with one setup.

It has Accuracy Plus! The heart of the Clausing Mill is its rigid, high precision spindle head. It has 7 ball bearings — spindle is chrome nickel steel, hardened and ground — quill, hardened and ground, has honed bearing seats — overarm is rigid steel casting with 3/4" thick walls precision ground. All feed screws have ground threads, turn on ball bearings. Table surfaces and dovetail ways on table, saddle, knee and column are precision ground.

It has Economy Plus! The Clausing reduces setup and operating costs. It's low in initial investment, low in upkeep costs.

Write today for the complete story!

CONDENSED SPECIFICATIONS

Size of Table	6" x 24"
Longitudinal Table Travel	15"
Transverse Table Travel	5"
Vertical Table of Knee	
Maximum Distance Spindle to Table	12"
Maximum Distance Spindle to Column	
Quill Travel	3"
Spindle Speeds: Six, 180 to 3250 R.P.M.	
No. 7 Brown and Sharpe or No. 2 Mor	se Taper

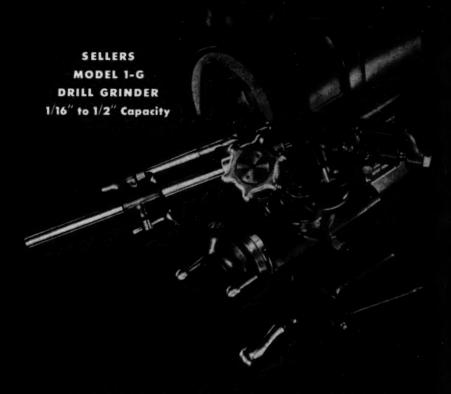
Operates from 1/2 or 3/4 HP, 1725 R.P.M. Motor

Spindle Optional.

MILLS, DRILLS, BORES, REAMS AND SHAPES . . . AT ALL ANGLES . . . WITH ONE WORK SETUP!

CLAUSING DIVISION, atlas. Press. Company
5-110 NORTH PITCHER STREET, KALAMAZOO, MICHIGAN





Nothing will do so much to reduce your drilling cost for so small an investment as a Sellers Drill Grinder?



CONSOLIDATED

MACHINE TOOL CORPORATION
WHOLLY OWNED SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

over the editor's desk

The Will to Win

DURING a conversation several weeks ago with a friend in military service who had just returned from a three year tour of duty in France, we asked the question, "What did you find to be the greatest difference between the French people you met and the Americans you have known?" His reply was immediate and most emphatic, "The French people with whom I came in contact-and there were many of them-lacked confidence. They constantly referred to a glorious past that they had once enjoyed; they expressed pessimism toward the present: they were most fearful of the future. To me it has always seemed that most Americans have usually been so busy planning for a better future that they don't have time to dwell on the 'glories' or the setbacks of the past nor on the misfortunes which might befall them sometime in the future.

These remarks remind us once again that here in America, like nowhere else in the world, there exists the opportunity, for everyone who will, to confidently forge ahead.

"The Facts, Ma'am" . . . and Mister

R. Benson of Harding College tells of a group of people who were sitting in a small motion picture preview room in New York City recently. They watched intently as a sound-slide film entitled "The Future of America" was given its national preview. At the end of the 25-minute presentation, a man sitting near the rear of the room turned to the person on his right. "This story makes me a piker," he said. "I've been uncertain about our economic future, and so I've been holding back on building a new home. Now I'm going ahead and build."

The thing that had eased his uncertainty about America's economic future

was the dramatized story of our dynamic economy, the measure of its continuing growth, its unlimited frontiers with their ever-widening opportunities for all Americans.

Here are some of the facts: In 1953 there were 4,000,000 babies born in the U.S.A. That's a record. And our people are living longer than ever before. By 1960 our population will be approximately 180,000,000. Constantly more jobs are being created. Total employment, including agriculture, was 62,000,000 in September, 1953. This is 17,000,000 more jobs than existed in 1939.

Although our population has had a net shift of almost six million away from the farms since 1940, we have at the same time increased our farm production to higher levels than ever before. We have 80 per cent more high school graduates in our population than in 1940. School enrollment totaled 32,796,000 last year. College enrollment has increased 55 per cent since 1940.

We're making great technological progress. Today only 5 per cent of the work done is manual; 95 per cent is done by machine. We're eating better. We're drinking 18 per cent more milk per person, eating 33 per cent more eggs, and 5 per cent more meat, fish and poultry per person than we were at the end of World War II. Forty-million Americans this year will get paid vacations. We have entered the Atomic Age and are witnessing a miraculous advance in industrial chemistry.

When all the facts are reviewed our citizens can be enthusiastic about the economic potential of our nation. There is only one big IF in the picture. These advances are sure to come IF we safeguard the basic elements of the American private enterprise system and give it the freedom and incentives that keep its life and strength surging forward.



Hanna Valves

On hundreds of machine and equipment applications, foot-operated valves can be used to advantage for the control of air or hydraulic cylinders. By keeping the operator's hands free for feeding or handling work pieces, he can work faster, more efficiently and with less fatigue. Production can be stepped up materially in many cases.

Hanna Foot-Operated Valves are available in single or double pedal models in 3/8", 1/2", 3/4" and 1" pipe sizes and may be used for pressures to 250 p.s.i. Write for details.

OTHER HANNA VALVES



UNITITE VALVES

3-way or 4-way, for air, oil or water, up to 250 p.s.i., three standard mounting styles.



UNITITE Jr. 1/4" VALVES For control of small cylinders, pilot control for larger valves or for tubing or light piping.

PILOT VALVES



3-Way Valves operated by cam, push button or lever for direct control of small cylinders and automatic control of large cylinders through Mastair valve.

MASTAIR VALVES



For control of cylinders at a distance, for reduced control pressure, for semi-automatic or automatic control.

SPEED CONTROL VALVES



Flo-Set Valves with micrometer graduations... in 1/4", 3/8", 1/2" and 3/4" sizes ... for air, oil or water to 250 p.s.i.



Hanna Engineering Works

HYDRAULIC AND PNEUMATIC EQUIPMENT ... CYLINDERS ... VALVES ... RIVETERS

1758 ELSTON AVENUE, CHICAGO 22, ILLINOIS



Machine Shop

Vol. 26, No. 12 MAY, 1954

features in this issue

Selection and Heat Treatment of Tool and Die Steels, Part I

By Howard E. Boyer

Directed primarily toward tool engineers, process engineers, tool and diemakers, and the like, this three-part article is intended to promote a greater spread of knowledge relative to the paramount importance of careful steel selection and heat treatment for tools and dies. Page 120.

Shipping Is Important, Too

By K. R. Benfield

Although the procedures outlined in this article are concerned primarily with the shipment of aircraft components, the various operations described are readily applicable elsewhere to ensure safe delivery of products. Page 128.

Quality Control in the Small Shop

By C. W. Kennedy

In this article, the author points out that quality control techniques ordinarily applied to large plants can be effectively patterned and fitted to the small shop with a little ingenuity. Page 136.

Machining Stainless Steel—Case History No. 15

By G. J. Stevens

The author illustrates and describes how a standard adjustable toolholder was converted into a laterally floating holder to provide for accurate reamer alignment in reaming stainless steel bar stock in a multiple spindle automatic, Page 144.

I-Tab-Wodi Plan Effects Time and Material Savings

By Harry L. Spooner

In this presentation, the author explains how a plan initiated a few years ago in the Caterpillar Tractor steel fabrication plant is now saving the plant well over \$1,000 a day in labor and materials. Page 150.

Sectional Rack for Bar Stock Storage

By H. G. Frommer

An interesting design of storage rack featuring unusual flexibility is illustrated and its method of construction clearly explained in this article.

Two-Position Reversing Milling Fixture

By W. M. Halliday

The author presents details of an interesting fixture for holding four pins while milling the ends. Page 180.

TABLE-I

CLASS	С	MN	SI	NI	CR	мо	w	V	СО					
1	.17	.40	25	3.20	1.15	.15								
2	.35	.30			5.00	1.15	1.10							
3	1.01	.27	.23											
4	.90	1.25	.30		.50		.50							
5	1.05	.65	.30		5.25	1.10		.25						
6	1.50	.32	.30		11.80	.80		1.00						
7	.25	.29	.26		4.03		15.10	.52						
8	.85	.25	.30		4.15	5.10	6.30	2.05						
9	.87	.26	.25		4.00	4.60	5.60	1.80	9.00					

The complexity of tool steel classifications can be simplified to some extent by dividing them into groups. This table shows one method which divides them into nine groups. Most tooling applications can be covered by compositions similar to those shown.

Selection and Heat Treatment of Tool and Die Steels, Part I

Directed primarily toward tool engineers, process engineers, tool and diemakers, and the like, this article is intended to promote a greater spread of knowledge relative to the paramount importance of careful steel selection and heat treatment for tools and dies.

By Howard E. Boyer

IT WOULD not be surprising if many individuals would be amazed at anyone attempting to cover this broad subject in the limited scope of a magazine article. It is true that anything simulating complete coverage of either of the two phases comprising the above subject could easily require the space offered by one or more books. There is no intention on the part of the author to cover either phase in detail within this treatise. It is the intent and pur-

pose to promote a greater spread of knowledge among tool engineers, process engineers, tool and diemakers or others associated with making and using tools and dies, relative to the paramount importance of careful steel selection and heat treatment for tools and dies.

From dictionary definitions the layman might wonder why the term "tool and cie steels" is nearly always spoken of in such a manner, for a die is most certainly a tool. In other words the simple term "tool steels" should suffice. However, the metalworking trade seems to regard a die as a rather special member of the tool family; consequently the universal term "tool and die steels." Obviously, there is no reason why the author should take exception to the accepted terminology so that this dual term will be used in the accepted fashion throughout this treatise.

Likewise, the metal fabricator's conception of the term tool steel is generally somewhat different compared to a layman's understanding. By definition, a tool steel is a steel employed for making tools. Since there are at least some tools made from every conceivable type of steel ranging from low grades of Bessemer steel costing less than ten cents per pound up to and including high alloy steels costing more than two dollars per pound, one could easily call any steel a tool steel. There-

fore, no existing definition for tool steel is satisfactory to both the maker and the user of steels, although there does exist a condition of general understanding in the metalworking industry relative to the meaning of the term. A maker of tool steels usually thinks of himself as a producer of fine steels irrespective of the purpose which the steels will eventually serve. In the same manner that many steels other than those usually considered as tool steels are used for making tools, there are thousands of engineering purposes other than tool applications which are fulfilled by the use of steels generally classified as tool steels.

In spite of these facts, the metalworking trade usually regards most of the higher carbon steels as well as the higher alloy compositions as tool steels; particularly if their composition does not fit any range prescribed by The Society of Automotive Engineers or The American Iron and Steel Institute.

Various attempts have been made to classify the many hundreds of different tool steels and establish specifications similar to those which have been instituted for engineering steels by The Society of Automotive Engineers and other technical organizations. In some instances this



Fig. 1—Photomicrograph of martensite—the structure formed by heating and quenching carbon or low alloy steels. Hardness is about Vickers 800 or RC-64. Magnification, 1000X.

has been done, but as yet this movement has not been carried out to any appreciable extent. Furthermore, there is no indication on the horizon that it will be carried out in the near future. Tool steels in general are of such diversified compositions that they have never lent themselves to the easy classification of S.A.E. steels where the amount of several alloying elements may be placed within comparatively narrow limits and then an entire family of steels, based upon the carbon content, is established. The carbon and lower alloy types of tool steels are made in a wide range of carbon contents which could, for the most part, permit such a means of classification; however, most of the higher alloy types of tool steels have a comparatively narrow carbon range where such classification would be futile. Tool steels cannot be classified on the basis of the predominating alloying element for in many of the more complex compositions one alloying element can be partially or wholly substituted for another with little change in the potential properties of the steel.

With so many different compositions of tool steel available, the tool designer or other individual associated with prescribing steels for a particular tool or die application may be left in a quandry unless he either possesses or has access to considerable metallurgical knowledge. In too many cases, through lack of such knowledge, a poor selection of the steel is made, often resulting in the loss of thousands of dollars from either complete failure or short life. It is not necessary to emphasize that

tools and dies usually represent relatively large investments. The normal practice is to write off tooling costs over a calculated number of production pieces. If the tool life falls short of the normal expectancy or complete failure results, a profit on the product may easily be turned into a loss.

One of the ironic aspects of such cases is the fact that the steel is too often selected on a cost per pound basis. In almost any case of a tool or die, the cost of the tool steel is the minor part in the total cost of these works of art. The hours of machine time and man hours by highly skilled craftsmen usually account for the major portion of the total cost. Many cases have been observed where the difference between the cost of a die made from a properly selected steel versus the same die made from an improperly selected material would have been a few dollars at the most, but the difference in performance might be several hundred per cent higher in the case of the properly selected material. Such a condition may be somewhat likened to a man who would purchase a poor quality of cloth and then take it to an exclusive tailor to have a suit made: obviously a mark of poor economy. In some instances, this simple analogy might even be a conservative illustration because in selection of tool and die steels for specific applications there are often cases where the proper material would cost no more and possibly less than an unsuitable tool steel.

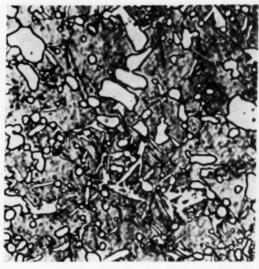
The natural question at this point is: How can one be guided so that a more nearly suitable steel will be

Fig. 2—Photomicrograph of duplex structure in hardened alloy tool steel. Matrix is about Vickers 800 or RC-64, but the white pools which are complex carbides show hardeness values up to Vickers 2400. These carbides impart the additional wear-resisting properties required for many tool applications.

selected for a given tool or die application? Certainly no single treatise, regardless of length, could possibly give advice, except in a most limited manner, on how to proceed because of the infinite number of different applications and combinations of influencing circumstances. Therefore, it is

only possible within the scope of one treatise to discuss the conditions in a general manner and point out some of the reasons for success or failure resulting from selection and subsequent treatment of steels employed for tool and die applications.

We often think of the subject in four different phases: (1) The individuals who do the selecting must first realize the importance of proper steel selection; this is purely a state of mind and the analogy in the foregoing discussion should help to establish the degree of importance beyond any doubt. (2) After the selector of steel has full realization of the importance attached to proper steel selection, the next step is to make sure what the required properties of the particular application may be; that is, will the tool be subjected to heat, abrasion, erosion, impact, corrosive media, and so on. (3) The third step is to find the steel



which can be heat treated so that it will provide the predetermined properties. (4) The last step, but by no means the least important one, is to select the type of treatment and place where such treatment will be performed. If a heat treating shop is a part of the plant where the tools and dies are made, the latter phase of step number four is usually answered automatically, but a major portion of the tools and dies produced in this country are made in a multiplicity of small shops where there are no heat treating facilities available so that the work is necessarily sent out to commercial heattreating plants. Assuming that such commercial plants are suitably endowed with both knowledge and equipment, they do not hire magicians, so that they are incapable of doing the best job unless they are placed in a position of knowing what is required of the particular tools they are assigned to treat. It is appalling to observe how many tools are either completely ruined or are rendered at least to some degree inferior because improper or insufficient information had been imparted to the heat treater.

It is mainly because of the recognized necessity for a wider spread knowledge relative to tool and die materials and their treatment that tool engineering has been removed from the category of mechanical engineering and established separately as a profession, which is as it should be. There is no doubt of the fact that tool engineering may be considered as a combination of mechanical and metallurgical engineering; whether it is more mechanical than metallurgical or vice-versa would be debatable, but this newest member of the family of engineering professions is certainly a cross between the two.

As stated in an earlier paragraph, many attempts have been made to establish some standardized means of classifying tool steels, but due to the thousands of different applications, no completely satisfactory method has yet been offered, although there are some methods of general classification which can be employed to at least place most of the compositions into families. From there on it is usually a matter of careful consideration based upon the specific application.

For proper selection, it is true that there must be some sort of base line established, which is usually done by grouping the different classes together. At best, there are some types and compositions which can hardly be classified into any family, but for most practical purposes about nine

groups will include the betterknown and more widely used tool steels. Table I lists these nine groups in a vertical column: numbers one to nine inclusive. Their approximate composition relative to content of carbon, manganese, silicon, nickel, chromium, molybdenum, tungsten, vanadium and cobalt in order are shown horizontally. It must be remembered that these classes by number merely represent an arbitrary selection by the author and cannot be regarded as official. Likewise, each and every one of the compositions shown is meant only to represent a typical member of the family. All of the elements shown, particularly those other than carbon, may vary rather widely in accordance with the steelmaker's ideas and the many different applications they are required to fulfill.

Notwithstanding all the variables, if a selector of tool and die steels has ready access to some concise tabulation such as shown in Table I, which does show the better-known groups and their approximate composition, he at least has a start toward making a suitable choice. It is then necessary to have some understanding of the metallurgical properties which can be achieved through heat treating these various steels. If the properties are understood and at the same time the application requirements are known, the selector is then much further along the way to a proper selection.

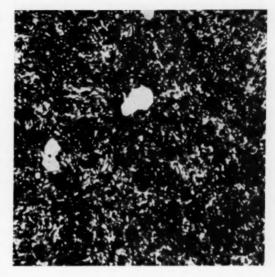
Tool steels are sold almost exclusively by trade names; that is, any one of the well-known tool steel makers can supply steels which approximate the composition of any of the

Fig. 3—Another duplex structure, but with less free carbide compared to Fig. 2. Resistance to wear will generally be intermediate to that of Figs. 1 and 2. Magnification, 1000X.

steels shown in Table I although they will bear a trade name assigned by the manufacturer. Even though the trade names within any one class may vary considerably in composition, they will usually possess similar metallurgical properties if they are properly heat treated. It is true that some closely restricted composition may be somewhat more suitable for a specific appli-

cation compared to another of similar composition, but in most cases the degree of difference in performance would not be great. Selection down to this fine point is usually based on a great deal of experience with the particular type of work. It is not uncommon to hear the question: Is this steel a good steel? (usually indicating some trade name). Excluding the possibility of some physical defects which can occur in any steel, there is no such thing as a poor steel. All steels are good if they are employed for the purpose they can best serve. Conversely, the most expensive steel might be called a poor steel if it is used wrong.

Probably the next important information which should be in the hands of the steel selector is a general working knowledge of some of the more important fundamentals of physical metallurgy. This would seem to be a part of the job for a



tool engineer since it has already been established that a tool engineer is a cross between a metallurgical engineer and a mechanical engineer. This treatise is not intended as a short course in physical metallurgy, but the properties of tool steels are dependent upon certain structures which are formed by heat treatment. In some cases these steels, after heat treatment, possess more than one structure; then we term them as duplex structure tool steels.

It is essential, before any tool engineer can gain a clear idea of how to select steels, that he has some knowledge of the properties possessed by the different structures formed in hardened steels. These structures are few and basically simple. The most predominate one of these is martensite, which is the metallurgical term applied to the structure which is formed by heating steels to some elevated temperature (usually

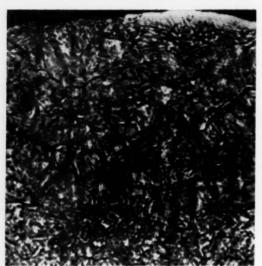


Fig. 4—Cross-section of a nitrided case — edge near top of picture. Nitrided cases on tools often provide the required resistance to heat and abrasion. Magnification, 350X.

above 1400 deg. F. or higher, depending upon the particular steel) and cooling rapidly as by quenching in water. The resulting structure is a homogenous aggregate of iron and iron carbide which is quite hard and brittle. Figure 1 shows how this structure appears in the metallurgical microscope. It possesses a hardness value of about 800 Vickers (approximately R "C" 64). It is necessary to quote hardness values from the Vickers scale due to the narrow range of true hardness which the Rockwell scale can accommodate.

Figure 2 is another photomicrograph showing an example of a duplex structure. In this case the matrix is also martensite of about the same hardness value, but the white pools which predominate throughout the structure are free carbides composed of carbon, iron, and at least one other alloying element. Even though the hardness measured by the Rockwell would be found about

the same, the hardness value of the individual carbides will be found as high as Vickers 2400 which is far beyond the range which can be accurately measured by the Rockwell scale. In other words, one can consider this latter structure as one basically composed of martensite, but liberally sprinkled with "diamond dust."

The structures just discussed represent two extremes in one respect: that is, the first one shows a martensite structure without any free carbide while the latter depicts one which contains about the maximum amount of free carbide usually found in any heat treated steels. The latter is actually well along in the direction of the structure found in a sintered carbide. Sintered carbides which are now used extensively in tool engineering may be thought of as a mass of alloy carbides (principally tungsten (held together by a relatively soft metal binder, usually cobalt. This accounts for the reason that indentation hardness testing of sintered carbides is usually futile as far as accurate results are concerned.

Various combinations of martensite and free carbide are possible, depending upon the composition and treatment. Figure 3 shows a microstructure with a more nearly intermediate amount of the free carbide.

A third constituent which is often employed in tool applications is the nitride case. Figure 4 shows a crosssection of a nitrided case with the extremely hard edge near the top of the illustration. The nitride case is a homogenous constituent showing hardness values somewhat harder than the purely martensitic structures (usually 950 to 1400 on the Vickers scale). These high values prevail only near the surface so that almost no grinding or finishing is allowable after the case is formed or the harder portion of the case will be removed.

The important role played by nitrided cases is becoming more widely recognized in tool engineering, although the two distinctly different processes must always be considered separately. The light case nitriding

(usually 0.001 to 0.003 inch in depth) obtained in a liquid salt bath is well known for increasing the superficial hardness of alloy cutting tools. This will be discussed in more detail in a later paragraph. The ammonia gas method which provides for case depths up to about 0.025 inch is generally unsuitable for cutting tools, but it is adaptable in providing for an extremely hard case on the medium carbon alloy steels generally known as the hot-work family, an example of which is Class 2 in Table I. The main difficulty with nitriding stems from the fact that for tools which demand frequent grinding they must be renitrided after about 10 per cent of the total case has been removed.

(To be continued in the next issue)

Jumbo Die Section for Giant Tube Reducer

ICTURED on a vertical boring mill at the Midvale Co., Philadelphia, Pa., is an 8,400-lb. die section, 50 inches in diameter. which will be used in a giant tube reducing machine to be placed in operation at the Tube Reducing Corp., Wallington, N. J. The die section shown is one part of a die unit as used in the tube reducer's compression forming process.



Shipping Is Important, Too

By K. R. BENFIELD*

Although the procedures outlined are concerned primarily with the shipment of aircraft components, the various operations described are readily applicable elsewhere to ensure safe delivery of products.

THE title of this article is corollary to industrial production. Every manufactured article, regardless of cost, type or size, must be placed in the hands of the ultimate user before it achieves utility value. In actuality, the quality of any product is determined by the condition in which it reaches the ultimate user and not by its condition when it leaves the production line. A product may pass final inspection with

*Chief of Materiel, El Segundo Division, Douglas Aircraft Company.

Area in shipping department where parts are received directly from the production line. Error is minimized by complete elimination of interim handling.



fiying colors, but if it is poorly packed and then injured during shipment, all previous efforts to ensure quality are nullified. A follow-up service department that puts the delivered product back in operable condition will do little to assuage the sour taste left in the mouth of the customer.

We in the military aircraft industry are assessed with tremendous crating, packing and shipping problems. While a blueprint of our shipping operations would be too comprehensive for application in detail by most firms, there most certainly are many facts of our operations which are applicable elsewhere. The sum total of achievement attained by the Douglas shipping department, turning the airplane over to the customer and safely delivering its equipment and spares-is analogous to the sum total of achievement that should be the goal of any shipping department, regardless of its size. This goal is the safe delivery of the product and all its component parts.

The complexity of military air-

craft delivery is not seen by the casual observer. It entails far more than the final check flight, acceptance by the purchasing agency, and then flying the airplane

away. A far more c o m p l i c a t - ed phase of the delivery is involved in the several carloads of spare parts that must be selected, sorted, identified, properly preserved, packed, and then shipped by land



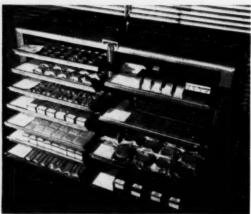
K. R. Benfield

carrier along with the departing airplane. In many cases, these parts must be transferred from a land carrier to a water carrier, and then end up in some far distant port near which the delivered airplane will be based.

In amplified perspective, this situation is similar to the situation in any industry where the product must be shipped to the customer along with a quantity of spares and accessories, and where installation and use of the product are dependent upon the arrival of these spares and accessories in good and usable condition.



Shipping department area to which parts that must receive a preserving treatment are routed.



Typical layout of parts constituting a single shipment on a "bakery" truck with pullout shelves. Parts are laid out in the order in which they appear on the packing sheet. This procedure simplifies a final check.

automatic pilots valued at thousands of dollars.

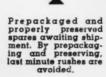
We do not wait until the product is finished to plan

At the El Segundo Division of Douglas Aircraft Company, each carload of spare parts that must accompany each departing airplane represents several months of planning, processing, sorting, storing and packaging. Handling these numerous parts demands a well organized shipping department, with perits shipment. Our shipping

functions start even before the airplane enters production-immediately after the award of the Government contract. Trained shipping

sonnel well trained in the techniques of identifying, processing, packing and crating critical aircraft components ranging all the way from gasket sets to engines, and from minor instruments to gyrocompasses and

personnel is assigned to the job of acquiring comprehensive knowledge concerning the new airplane, including data on all equipment that will be installed in or will accompany the airplane at the time of its delivery. This is absolutely necessary as each delivered airplane must be accompanied by a packing sheet





Here spare parts, each individually packaged, are stored pending shipment.

listing all equipment in detail. It is the Government inspector's signature on these packing sheets that denotes Government acceptance and substantiates the manufacturer's request for payment. Detailing these packing sheets is in itself a major shipping department function. as all instruments, propellers, engines, and so on, must be itemized by serial number.

The shipping department is responsible also for the accumulation and stowing of all "loose" equipment and supplies that go with the airplane. These consist of such articles as tool kits, first-aid kits, K-rations, pilots' chart boards, and equipment for ground handling of the airplane. These items must be selected, properly identified, stowed in the appropriate place and then fastened down to prevent movement during flight. While seemingly simple, these auxiliary shipping operations involve a lot of responsibility.

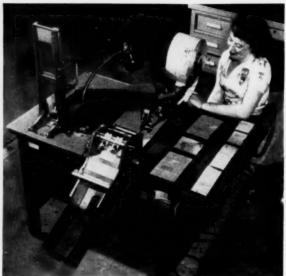
A Government contract for an airplane includes a sufficient quantity of spare parts to maintain the airplane in a flight status for an appreciable period of time. These spares must be "ready to go" at the time the airplane is delivered; it is definitely not a last minute job.



All through the building of the airplane, these parts are being collected, identified, and made ready for shipment.

This is accomplished in an orderly manner. The Douglas shipping department lists the spares in the following general categories: (1) operational spares; (2) maintenance spares; (3) accessory spares; and (4) electrical spares. In addition to these general categories, two special categories of parts are required and must be made ready. These are (1) parts for service changes, and (2) ground handling equipment.

The operational spares include parts that may be required at training stations, aboard aircraft carriers, or in advance combat areas (in case of war). They comprise such items as spare wings, landing gear struts, engine cowling, wing tips,



Printing and cutting preservation bags on an addressograph machine. The part name, its number, and preservation requirements are all imprinted on the bag using previously prepared plates.

cockpit enclosures, and other replacement units which can be installed by service personnel in a minimum of time and without the use of heavy or specialized repair equipment.

The maintenance spares include parts that will be required during general overhaul at repair depots where heavy repair equipment is available. Such items as engine pistons, packing rings, gasket sets, springs, and so on, all of which require considerable disassembly of the airplane or engine to be installed, are included in this category.

Accessory spares, as the name implies, are spare parts for aircraft components which are manufactured by companies other than the aircraft manufacturer. Nevertheless, it falls to the airplant shipping department to see that these spares are available and ready to go. They include such items as wheels, tires,

brakes, hydraulic gear, and so on. Most electrical spares also originate "outside" and include switches, wiring, lights, servomotors, and other items.

Service change parts, usually in kit form, are the parts required to accomplish a design change in the

airplane after its final delivery. These might include a new type cowling, a new gun mount, or similar items. The ground handling equipment consists of tow bars, cockpit enclosure covers, propeller covers, engine tarpaulins, work platforms, and other apparatus.

The gathering, sorting and identifications of these numerous "spares" must be "air tight" insofar as errors are concerned. Leaving out one gasket in a gasket set, or omitting one item in a service change kit, is analogous to omitting the entire item. It could require weeks of time, a huge amount of paperwork, and considerable money to supply the one missing item. Meanwhile, the airplane would have to be grounded. During a war, this would be extremely serious, as a grounded airplane is a "sitting duck" for an enemy bomber.

To minimize the chance of error.

all parts destined for shipment are delivered directly from the production line to the shipping department. Interim handling is eliminated. As the parts arrive in the shipping department, they are counted and routed into a prepackaging line. At this point a packaging expert outlines the method of preservation and type of packaging to be used.

All of the packaging materials—special paper bags, pouches, polyethylene bags, set-up boxes, and other special materials necessary to package the parts as a unit package—are obtained and placed with the parts. The parts are then inspected by company and Government inspectors, and each bag or container is stamped with the inspector's stamp. In order to streamline the op-

eration further, all identifying markings for the unit package are applied by means of addressograph and graphotype machines which print and cut the individual bags in a continuous operation.

Prepackaging of spare parts ensures safe storage of parts pending shipment, and freedom from corrosion, dust and other detrimental factors, thereby enabling items to reach their destination in usable condition. In addition, it alleviates the last minute "surge" to meet deadline due dates.

After parts have been preserved and packaged, they are forwarded to a predetermined stock location where they remain until such time as they are shipped. During the interim, all necessary records are ad-

View of crate construction department where all shipping crates and boxes are mass produced to Government specification.





Boxes ready for use. As each box is intended for specific contents, prestenciling of shipping data is possible.

justed, shipping documents created and inspection completed. Again, the addressograph and graphotype machines are used to effect mechanical "reproduction" of necessary papers.

All spare parts delivered to the shipping department are binned by part number, and locations are controlled by a wheelex to simplify pulling the parts when it comes time to fill a specific outgoing shipment. After pulling, the prepackaged parts are placed on a handling truck along with the packaging sheet and delivered to the layout group. Here the packages are laid out in "baker" trucks with pullout shelves. The packages are "laid out" in the order of their listing on the packing sheet and are checked by Douglas and Navy inspectors to ensure that each

package called out is there. The parts are then delivered to the packing section for intermediate packaging in cartons and then to the crating section for packing in an exterior container or crate.

Crate and box construction for aircraft spare parts is a specialized job due to the fragile and costly nature of many contained items such as airplane wing assemblies, control surface assemblies, and glass or plastic enclosures, which must be completely protected from possible rough handling during shipment. All spare parts containers are designed in cooperation with the Government. Drawings for each type of container are submitted for Government approval before they are used. When the crate drawing is approved, the crating department begins to

prefabricate the boxes on a production basis. Prefabrication on a production basis saves time and material, is more economical, and eliminates a possible "bottleneck" source in the event of expedite shipments. Immediately after production, all boxes are stenciled to indicate the type of parts they will contain.

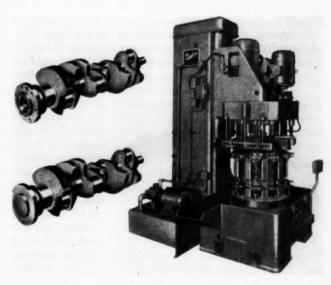
Although to an outsider the shipping department is usually not identified with the industrial glamour accorded high-speed and precision production departments, people "in the know" realize that proper packaging and shipping are vital links in the overall pattern of getting the products into the hands of the ultimate user without damage and in good working condition.

As previously noted, and because of the military status prevailing at the El Segundo Division of the Douglas Aircraft Company, our shipping operations are more rigidly controlled than is necessary in many civilian production concerns. However, at the same time, and for its own benefit, every company has a vital interest in getting its products to the ultimate consumer in good condition. This article was written with the thought in mind that a verbal blueprint of the Douglas shipping operations might offer suggestions to other concerns in relation to their shipping problems. If even one minor suggestion helps. we'll feel that our time and effort were well spent.

Special Multiple-Spindle Machine for Processing Crankshafts

TWENTY-SIX operations on 96 crankshafts per hour at 80 per cent efficiency is what this vertical Buhr special multiple-spindle machine accomplishes. Designed to

process crankshafts on the new V-8 engine of one of the leading automobile manufacturers, the machine consists of a 26-spindle combination drilling and tapping head, 10-station holding fixture, and precision automatic index table. Operations performed on the crankshafts with this specialpurpose machine include drilling and tapping six 7/16-20 holes, drilling and reaming one 7/16in. dowel hole, plus drilling, reaming and counterboring a center hole.



Quality Control In the Small Shop

By C. W. KENNEDY

The author points out that quality control techniques ordinarily applied to large plants can be effectively patterned and fitted to the small shop with a little ingenuity.

YOU hear the remark made frequently that quality control techniques are fine in the large plant but you cannot apply them with much success in the small shop. Judging from the success some small shops have had with modern quality control methods, the above thesis should be open to debate.

Adopting this negative sort of philosophy may have deprived many a smaller company of an excellent chance to cut costs and make a greater profit. By so believing they may have passed over a wide-open opportunity to establish for themselves a reputation for putting out high grade, reliable products. A diet of such restrictive thinking may have tended to stunt their growth.

Peculiarly and significantly, the big fellows wish their smaller brethren would get about doing something more systematic in the nature of quality control, the reason being that so many small shops are, in one fashion or another, vendors or subcontractors to the large plants. The latter have plenty of problems inherent to their type of manufacture anyway and most of them would gladly farm out more business to the small shop specialist if they could get more satisfactory combinations of price, quality and reliability.

Quality control can be patterned and fitted to the small shop just as readily as long pants can be made for the midget, the normal adult or



"Quality control can be patterned and fitted to the small shop just as readily as long pants can be made, for the midget, the normal adult or the circus giant, the main difference being that you use less cloth for the little fellow."

the circus giant, the main difference being that you use less cloth for the little fellow. While no comprehensive or precise pattern can be outlined in a short article, enough pertinent suggestions can be made so that the addition of a little ingenuity, initiative and persistence should enable any small plant owner to get on the right track. For the purpose here a small plant might be defined as employing from about thirty production workers up to, say, one hundred thirty.

Probably the first road block put in the way of quality control, especially in the shop with less than fifty on the production payroll, is the natural absence of any formal or systematic inspection. Everybody, including the brass, knows everybody else in the company, and knows what each is capable of. The idea of one in such a group putting in his time solely as an inspector sometimes seems absurd. Whatever might be termed inspection would be performed more or less casually by the shop foreman. If a customer complains, a rash of righteous attention to tolerances, burrs, toolmarks and workmanship breaks out in the whole room and, like a rash, disappears in a day or two.

As the shop grows a little larger, the need for a definite inspection function and routine becomes more apparent perhaps. Often pressure from the customers causes the small shop to assign part of a man's time to a more or less formal inspection of the finished products just before they are shipped. Then perhaps there is suddenly enough final inspection to warrant a full time man or woman. At about this point in expan-

sion and progress, the next customary obstacle crops up.

Sorting out and throwing away or trying to salvage—anywhere from five to twenty-five per cent of the goods just as you expected to ship them soon shows up to be expensive quality surveillance. Prevention fast



"Sorting out and throwing away—or trying to salvage—anywhere from five to twenty-five per cent of the goods just as you expected to ship them soon shows up to be expensive quality surveillance."

becomes the theme song. Apparently some system of checks and inspections should be carried on down the line. But nobody has a good idea of how many process inspectors should be employed without having this new inspection cost all outdoors or suck up already narrow profits. The big plants too, in fact, often display rather vague policies on this item.

The amount of inspection payroll would vary of necessity from area to area and between shops. Some parts, products and manufacturing processes demand more inspection than others. Worker skill and conscience also vary, as well as supervisory capability. No exact figure on inspection burden could ordinarily fit all situations.

To get to a point of departure, however, there seems to be good reason to work from the figure of 5 per cent, meaning that the amount of inspection payroll should be contained so that it is somewhere near 5 per cent of the production payroll. In other words, adequate inspection and satisfactory quality control can be maintained by having, on the average, no more than one inspector for every twenty production operators.



"In other words, adequate inspection and satisfactory quality control can be maintained by having, on the average, no more than one inspector for every twenty production operators."

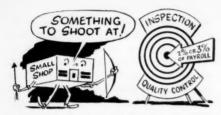
In using the word inspection, above, all routine inspection and quality control functions are included. If sampling of purchased partsincoming or receiving inspectionseems to be required, then such inspection time and expense should be added in to the 5 per cent ratio. The figure is intended to cover all or any first piece inspections, patrol or process inspection and final inspection. The figure should include what is paid to any who specialize in statistical quality control procedures. In many circumstances it can take in the manpower and time necessary for tool, jig and gage inspection.

There is one exception in this 5

per cent coverage. If because of the nature of the operation or process, or for other reasons, it seems necessary to inspect, gage or test every piece, part or product at any point, then such 100 per cent inspection (which is most often nothing less than continually sorting the good out of the bad) belongs rightfully under production. If every unit must be examined - handled again - in some fashion after it is made, the so-called inspection is just as much a production operation as filing or buffing, wiping off, weighing or packing, 100 per cent inspections belong under production supervision. Why hide a definite unit cost and expense in the books as inspection overhead?

In setting down 5 per cent as the ratio of inspection to production, we are not establishing an absolute figure. Rather, it is perhaps a maximum. For the shop that has entertained little or no formal quality control, it seems to be a good target to shoot at. Experience in a number of situations where reasonably comprehensive cost figures have been secured shows that savings in the reduction or elimination of scrap, salvage operations, field service, repairs and replacements, and deteriorating trade relations more than pay off the inspection burden. The cost of one person out of twenty in the manufacturing organization devoting full time to quality surveillance has turned out to be good, overall shop economics.

At the same time naturally every means would be taken to lower the ratio so that inspection and quality control amount to possibly only two or three per cent of the production



"At the same time naturally every means would be taken to lower the ratio so that inspection and quality control amount to possibly only two or three per cent of the production payroll they serve."

payroll they serve. But there is a point where such potential economy should be checked.

Quality control effort and inspection can be so thinned out, cut down or diluted that it earns no return and becomes plain costly. In such a case, a shop would be better off without it entirely. To assign forty or fifty machines or operations to one inspector to check, for example, could amount to love's labor lost. The habitual, conventional costs in scrap, reoperation, replaced goods or price cuts roll merrily on unaffected by the thinned out daubs of inspection, and the lone inspector's pay checks become merely tributes to impotence.

At this junction we can bring in quality control's statistical methods to guide us. The sampling techniques which the quality control engineer uses plus the laws of probability on which they are based point out pretty clearly the irreducible minimums of samplings and inspections that would be at all accurate or effective in disclosing the standard of quality a shop is putting out. In fact, a major purpose of quality control engineering is to prevent the expense and effort of too much or unneeded inspection and simultaneously to disclose situations where too little

inspection could be only lost motion.

So, at this junction also, the small shop pulls up short before another obstacle. How can we, the small shop asks, afford the services of a quality control engineer? Where can we get a man to administer our quality program at a rate we can justify?

Part of the answer to the first questions comes readily once a decision is made to go ahead with formal inspection routines. The routine sampling, charting and statistical methods of quality control are as much a necessary tool of inspection as the surface plates, comparators, gage blocks and micrometers commonly thought of. Each inspector, in other words, should have as careful indoctrination and training in quality control techniques as he is expected to have in inspection equipment and measuring practices.

A decade ago the small shop would have found considerable difficulty in arranging for any inspectors to get education in quality control details. But today there are few localities where there cannot be found reasonably available at least annual courses in quality control. Many of the colleges and schools now offer evening



"The routine sampling, charting and statistical methods of quality control are as much a necessary tool of inspection as the surface plates, comparators, gage blocks and micrometers commonly thought of."



"Those smaller organizations that have tried such a combination in talent have found their engineer's salary an investment rather than an expense."

extension or summer courses in the subject and the gaps in other areas are filled in by the widespread section of the American Society for Quality Control. Inability to find out how to go about modern quality control and inspection routines is no longer a valid excuse.

Then too, as far as education in and administration of quality control is concerned, qualified and experienced quality control engineers are now, as compared to ten years ago, available as consultants. Many of the established consulting firms have recently added quality control to their list of technical and management services. A small shop should be able to contract with such sources for enough in assistance, education and administrative pattern so that its own people can carry quality control on from there for fees down in the few hundreds of dollars.

An increasing number of smaller shops have lately too seen the wisdom and profit in adding to their operating staffs one professional specialist who might be termed an industrial engineer. His education and

experience have qualified him to organize, pattern and install in the small shop the latest techniques of cost accounting, time and motion study, work simplification, materials handling, production control and similar modern management developments. Frequently he is equipped to handle problems normally assigned to a tool engineer or even, for instance, to a metallurgist. If the average industrial engineer of the type implied has not already worked in quality control sometime in his career, he can readily pick up the specialty. Ordinarily the planning and administration of all the procedures and specialties just implied will not unduly overload a capable man in a small shop. Those smaller organizations that have tried such a combination in talent have found their engineer's salary an investment rather than an expense.

So far as quality control procedures are concerned, the going is fairly easy in a small shop. A sensible start at it includes sampling parts and products regularly and systematically, and a suitable sampling table for small shop or job shop operation appears in Fig. 1.

Size o											S	mple Size	
0 -	20	I	oi	e	C	e	8						11
21 -	30	-											17
31 -	50												21
51 -	70										*		24
71 -	100												27
101 -	200												31
201 -	500												35
501 -	1000												45
1001 -	2000							ı					55

Fig. 1—Suitable sampling table for small shop or job shop operation.

To use the table, the work can be sampled at any machine, operation or assembly, or the final product can be sampled before it is shipped. The table can be used to check the quality of any parts or components the small shop might happen to purchase.

As an example, suppose a machine has finished an operation on some 85 pieces in the past hour. According to the table (Fig. 1), a sample of 27 pieces should be taken from the batch of 85 and inspected. If, among the 27-piece sample, no defective or rejectable pieces are uncovered, the batch of 85 can be "accepted" as satisfactory. But if just one piece among the 27 fails to qualify, then the batch of 85 should be rejected. The same rule applies, of course, where more than one reject is found in the sample of 27.

To use technical quality control terms, the "acceptance number" for the whole table in Fig. 1 is 0. If one or more rejects are found in a sample, the "quality level" of the batch from which the sample was taken is no better probably than 3 per cent. In other words, if a sample size shown in Fig. 1 uncovers any rejectable piece or units, the work itself will most usually be found to contain at least 3 per cent of defectives if the batch is completely—100 per cent—inspected.

When a small shop can keep its rejects—scrap and reoperation—below the 3 per cent figure, so that the quality control sampling seldom if ever rejects a batch, it will probably have little worry about parts cost. It's the parts we make and throw away (and come back to make an-

other day) which crowd out legitimate profit. And if the small vendor successfully ships parts, components or products at a quality level consistently better than 3 per cent, (few of them do without some form of systematic quality control), it will have little worry about holding its customers or about getting new ones.

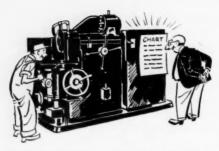


"It's the parts we make and throw away (and come back to make another day) which crowd out legitimate profit."

It will have little worry about getting a fair price and less about price cutting competition.

One warning should be sounded in connection with using such small size samples as the table in Fig. 1 allows. A sample must be thoroughly "random," to use quality control terms. The inspector must take time to dig into the batch; he can't lazily skim a dozen or so parts off the top of a tote box or work pan. The sampling must cut down, in and through an adequate cross section of the work being checked.

The effort in this limited space is simply to point out by one or two quick samples that undertaking quality control techniques is far from complex. Another systematic method which will help the small shop owner keep his machined parts within the specified tolerances is known



"The shop foreman or the big boss can tell at a glance what kind of quality a machine or operation is putting out and, simultaneously, whether or not the inspector has been on the job."

as the average and range chart.* Where these charts are consistently and persistently used, it is easily possible to hold the out of tolerance pieces in a day's work from a machine to a level lower than ½ of 1

per cent—less than 5 out of 1000 pieces fail to fit the gages.

Still another effective quality control and inspection system is illustrated in Fig. 2. A minute's study of the form pictured will indicate (1) that the inspector gets around to a machine about once an hour, (2) that he takes a random sample of the work completed since his last visit and (3), that after suitably inspecting and gaging each unit in the sample of 10 pieces, he writes down on the form the count of defectives found in the sample, if any.

Where the inspection uncovers out-of-tolerance pieces or other substandard workmanship, a brief report of the conditions appears on the inspection form as Fig. 2 illustrates. This sort of factual reporting usually becomes about the most valuable service the system offers, especially when one report is hung (by clipboard usually) on each machine.

Date //-17				Machine No. 7 - 21	Part No. 6P 1234	Order No.
Time	ss	d major	d minor	Report		
7:45	10	2		Band reat high		
8:25	10	0				
9:10	10	0				
10:10	10	1		1746-1748 is 1752		
10:50	10	0		Pown		
11:30	10	0				
12:45	10	1		1012" ecc	entric	
1:40	10	0			*	
2:20	10	0				
	10					i
Totals	90	4				Per cent defective 4/2, majors Per cent defective minors

Fig. 2—Form used in one particular type of effective quality control and inspection system.

^{*}Copies of a Dimensional Quality Control Primer can be secured from Federal Products Corp., 1144 Eddy St., Providence, R. I. This booklet contains a very simple and complete description of Quality Control by Average and Range.

The shop foreman or the big boss can tell at a glance what kind of quality a machine or operator is putting out and, simultaneously, whether or not the inspector has been on the job.

At the end of the day, as Fig. 2 shows, the columns are totalled and a so-called "per cent defective" is calculated. In many shops the per cent defective is further recorded on a chart of the kind appearing in Fig. 3. Without going into statistical details, the chart in Fig. 3 displays the quality record of one particular machine for a month. A discerning look at the chart discloses that the per cent of defective work reached or exceeded the upper allowable limit only four days during the month. All the rest of the time the operator put out at least a commercially acceptable level of quality and on some days his work contained practically no substandard pieces.

The small shop need not necessarily *invent* a better mousetrap in order to have more and more trade beating a path to its door. It can secure the reputation and prosperity it



"It can secure the reputation and prosperity it wants and it can show the progress, growth and profits which are the main reasons why a man invests his money and puts in a day's work, by making better, more reliable, products than the other fellow."

wants and it can show the progress, growth and profits which are the main reasons why a man invests his money and puts in a day's work, by making better, more reliable products than the other fellow. Constructive, practical, intelligent and persistent use of modern quality control methods has been found to be a surefire way of manufacturing better products.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

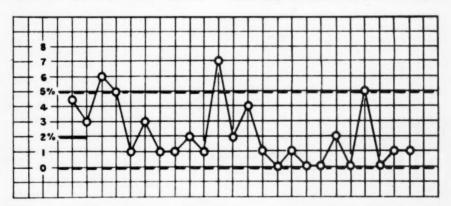


Fig. 3—Chart used in many shops for recording "per cent defective." Chart readily indicates the quality record of one machine for a month.

Case History No. 15 Machining Stainless Steel

By G. J. STEVENS*

Operation: Reaming stainless steel bar stock in a multiple spindle automatic.

Problem: Poor reamer alignment. The job required a floating-type holder; however, the only toolholder available at the time was a standard adjustable holder. And the or-

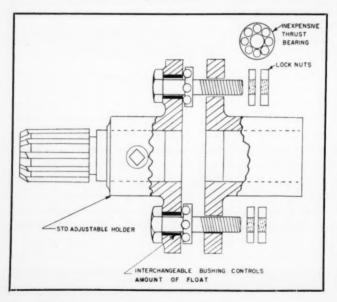
der was one that was emphatically marked "Rush."

The cost of a special floating toolholder could not be justified for the job; therefore, the machining engineer decided that the best solution was to convert the standard holder into a laterally floating holder. He used two plain flat-type thrust bearings for adjusting bolts, and then

reamed out the bolt holes on the toolholder plate to accommodate interchangeable bushings that would readily control the amount of float.

As the accompanying drawing clearly shows, the result of the operator's effort was an inexpensive type of floating toolholder that fully met the requirements of the particular job at hand.

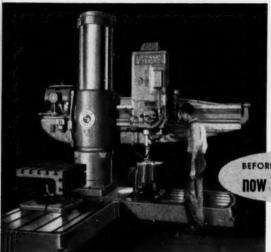
* Machining Engineer, Armco Steel Corp.



144

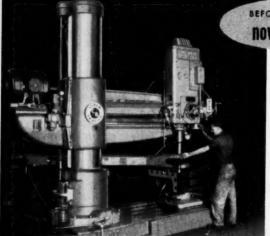


BICKFORD cuts



floor to floor time!

BEFORE 38 MINUTES now 23 minutes



BEFORE 5 HOURS now 3 hours

> These two jobs are done with time savings at the Ohio Steel Foundry Company of Lima, Ohio.

> The machine (upper illustration) is drilling breech rings for guns from 76MM to the 155MM size. In this tough material a $2\frac{1}{2}$ " diameter lead hole is drilled and opened up to a $3\frac{1}{2}$ " diameter with a core drill.

> Machine, below, is drilling 35/16" lead holes in a 9-foot Ladle Vale. Holes are opened up with a single point boring tool. Time savings result from the outstanding ease of control, and the power and rigidity of Super Service Radial Drills.

For power, accuracy, easy handling, check on Cincinnati Super Service Radial Drills.

Write for Catalog R-29.



(3) RADIAL AND UPRIGHT DRILLING MACHINES

ICINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio, U.S.A.







Cutting Edges That

Cut Costs

Once you start using National Testiwhether for roughing or Brishing, for production or for extensor—provid stop with stars. Their time cutting edges give you the better work that cuts your posts.

NATIONAL TWIST DRILL AND TOOL COMPANY

Sichotter, Middigun, M.S.A.

Distributors in principal cities.
Factory branches: New York * Detroit
Chicago * Dallas * Son Francisco



I-Tab-Wodi Plan Effects Time and Material Savings

. . By HARRY L. SPOONER

In which the author explains how a plan initiated a few years ago in the Caterpillar Tractor steel fabrication plant is now saving the plant well over \$1,000 a day in labor and materials.

INSITORS to Caterpillar Tractor Company plant at Peoria, Illinois, are impressed with the posters throughout the huge plant reading "I-Tab-Wodi — Is There a Better Way of Doing It?" The main object of I-Tab-Wodi is to save time, labor and money by eliminating every waste possible. In the steel fabrication division, this means finding not only a better and more economical way of cutting steel sheets and bars into their proper parts, but also finding a way to utilize the salvage steel left from the original operation in making smaller parts with the least waste of material and the greatest conservation of time and labor.

This plan was initiated in January 1950, according to Charles Ehrett, superintendent of LL material control and transportation, and, with the cooperation of the engineering, planning, metallurgical and inspection departments, along with the employees throughout the shop, the plan has been developed until at present it is saving the plant well over \$1,000 a day over the for-

mer method of using new blank steel for each operation.

It saves steel for 500,000 piece parts a month. Four thousand pieces of scrap are converted into 40,000 working parts at a profit. Instead of each job being made from blank steel, 35 percent of the jobs, or operations, are now done with the use of salvage steel. These huge savings have been of great importance in maintaining Caterpillar's position with competitors in the field.

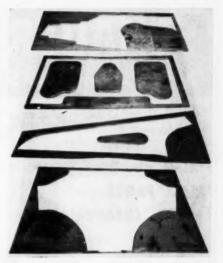
There are two sources of salvageable material. One is from the trimmings left over from the regular daily operations and the other is from material spoiled in making, due to errors in reading of blueprints or measuring rules by employees. While the latter produces a sizable amount of salvage, by far the greater savings comes from the daily routine of operation. This produces salvage material that is uniform day in and day out. Many of these salvage pieces could be used for any one of several smaller parts, but the idea is to use them for the parts for

which they are best adapted and which require the fewest number of cuttings. As steel is usually bought by weight, the fewer the number of pieces that can be produced to secure a given weight, the more profitable the salvage operation becomes.

To save money, the jobs run from salvage are run regularly just the same as the original run that produced the salvage. It is not a hit and miss proposition, observed Mr. Ehrett, but a well organized program. In other words, salvage pieces are not thrown into a box and then puzzled over what they can be used for. Every piece of salvage is used on a pre-determined job, and when odd pieces go into a tote box their use has already been determined.

To facilitate the use of the salvage, the portions of the trimmings suitable for re-use are freed with the least possible number of cuts from the remainder, resulting in pieces that are similar in shape to those from corresponding trimmings. The parts not suitable for re-use are cut into lengths suitable for the foundry. Each of the usable shapes is given a code number to designate it and each code-numbered shape is used for making one or more particular pre-determined parts. As the trimmings are cut into these shapes. they are placed in steel tote boxes and hauled with a hoist-type truck to storage space adjoining the salvage equipment. From here they are taken the same way to the points where the parts are made from them.

Whenever a new product is put out or a change made in the parts of an established product, studies and experiments are made to see just what salvageable material the new parts produce and just how the trimmings from these can be utilized to the best advantage. When this is determined and production is begun, the use of the trimmings has already been decided and the pieces coded. Oftentimes it is found that a certain trimming or slug is exactly the size or nearly so as the exact size of a part for which it can be used. Ex-



These illustrations show the shape of original parts cut from steel sheets and the shape of what remains. Formerly, all of this remaining material was sent to the foundry. Under I-Tab-Wodi, most of this remaining material is salvaged for making other parts rather than making them from new blank steel. The parts for which salvage material is used have been predetermined. The sheets as shown here after the original part has been cut out are clipped with the shears at the most convenient places and the pieces salvaged are coded and stored in bins until ready to use for other parts. After the clipping, the pieces too small to be used for anything are sent to the foundry.

perience has taught for what specific purposes various shapes of scrap can be profitably used. At no time is salvage material of inferior nature used to make a part. While economy in the use of scrap is stressed to employees, an effort is also made to impress them that cost reductions are greater if more care is used with the prime materials rather than committing a second working operation to the salvage program. The best way to save material, they are taught, is to make full use of it. One instance is in

cropping ends of steel bars and sheets.

For example, here is a 20-foot bar. It is supposed to make five four-foot lengths. But as it comes from the supplier, the length has been sheared at an angle. Measured from the wide point of the angle, it is 20 feet. But in a hurry, the employee crops the end an inch short. This means

cutting only four four-foot lengths and having one length three feet, 11 inches left over, which is scrapped. With more care in measuring, this would have been eliminated.

I - Tab - Wodi has been very effective in keeping employees and supervisors alert to saving at the source as well as to make more effective use of the scrap. It has also been effective in developing more efficient and safe ways of handling the materials methods that not only fit specific cases but can be adopted a permanent basis.

The savings program became very effective



Polishing cooking ware is just one of many jobs performed by Schauer Speed Lathes.

Schauer Speed Lathes are used by leading manufacturers to handle an extremely wide range of secondary finishing operations on metal and plastic parts. They perform many jobs—filing, trimming, de-burring, lapping, polishing—in less time and at lower costs. Single speed, two speed, variable speed models. Chuck, collet and vacuum holding fixtures. Investigate their advantages for your production. You'll save with Schauer!

SCHAUER MANUFACTURING CORP.

4501 Alpine Ave., Cincinnati 36, Ohio



SUPREME PRODUCTS, INC., 2222 So. Calumet Ave., Chicago 16, III.

right from the start. For instance, the number of pieces of salvaged material used increased from 19,430 the first month to 284,979 the twelfth month. The weight of these increased from 29,055 pounds the first month to 434,557 pounds the twelfth month. The savings increased from \$967.54 the first month to \$14,470.75 the twelfth month.

In the first survey, made from

only 10 thicknesses of material, 41 sizes were eliminated entirely because salvage could be used. From one thickness only, seven sizes and specifications on hand with a total weight of 38,555 pounds were sold because of no further use.

In one certain schedule, from a total of 2,975 work orders, 490 were made from salvage. This material furnished 388,271 pieces weighing

668,776 pounds and having a value of \$22,-162.60.

In salvaging a single slug, 13 different parts were cut. Originally these were cut from eight different sizes of steel. Today, one of these parts. which has an average lot size of 4,000 pieces a month, produces enough slugs to run all the other 12 parts, which approximate 40,-000 pieces monthly. This eliminates seven sizes of steel and saves Caterpillar from buying 28,-000 pounds of rough steel for these parts each month. This is accomplished without any decrease in shop efficiency.





Form and Duplicate a Wide Variety of Shapes in Metal as Heavy as 16 Gauge — Widths up to 24" — with Versatile DI-ACRO BRAKES

A number of forming jobs can be done with the Di-Acro Box Finger Brake by simply adjusting or changing the type of mounting bar on the contact surface. Di- Acro Finger Brake is:

- 1. A Box and Pan Brake-when equipped with a complete set of Box Fingers.
- 2. An Open End Brake—when Open End Finger is installed in place of Box Fingers.
 - A Bar Folder—when an Acute Angle Bar replaces the Box Finger mounting.
 - A Standard Brake—when a Forming Bar is mounted for heavy operations.

WANT MORE INFORMATION? Send for 32-Page Catalog

di-acro PRECISION

*pronounced Die-ack-ro Creators of "Die-Less Duplicating"

O'NEIL-IRWIN MFG. CO. 306 8th Ave., Lake City, Minn.



The object is not to simply find one way to utilize salvage but rather to find the one best way. For instance, in one operation a piece of salvaged material five feet long and curved on one side so that it was eight inches wide at the center and tapered to the ends was used to make five different shapes of parts. On one shape of these parts, only one part could be made. On two different shapes, four could be made of each. On one shape five parts could be used to make one simple particular part with a minimum of both cutting and waste. This part is a cut to length and width job and uses all the salvage this code number produces.

Added to the net savings on the salvaged material itself, are some other savings not reported, as follows:

- Saving the costs incurred in requisitioning and buying new material; also all shipping, receiving, storage and handling charges of same.
- 2. Saving on handling charges of the material which is finally scrapped. The scrap in building LL is loaded in the building in gondola cars. Foundry scrap is sent direct to the foundry and light gauge scrap directly to the firm buying it. This eliminates the transportation problem to the reclamation department, which formerly handled it, and also eliminates those handling costs and problems that the reclamation department would ordinarily be confronted with. These problems involve about three full gondola cars daily.
- 3. In several cases, production is speeded up by the use of salvage.

MORE YEARS OF BETTER SERVICE

At Phillips Machine Shop in Alliance, Ohio, they rely on Bullard Horizontal Boring, Milling and Drilling Machines. They do general machine work for a number of major manufacturers in this highly industrialized northern Ohio area.

"I choose Bullard," says Mr. Donald Phillips, owner, "because it is the best boring mill on the market. I have carefully checked other domestic and foreign makes. None of them have the weight, the solidity and the reliability of the Bullard machine."

Cost Cost



Investigate

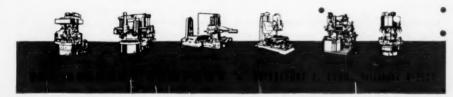
BULLARD —

if you're looking
for a versatile,
rugged horizontal
boring, milling and
drilling machine
with "built-in"
accuracy and

efficiency. Have your Bullard

representative explain

its many features or write to



This decreases shop operating costs and lightens machine burden.

The salvaging department in building LL has undergone a tremendous growth. Within 60 days after two machines were moved here from the reclamation department, the need for additional equipment became obvious. Since then three other machines have been added. The total original cost of the five

machines now in operation was \$50,734.00.

The number of employees in the salvage program averages 9 per shift, or 27 for the three shifts. Besides the salvage program, employees in this group sort, process and load into railroad cars all the steel scrap from the various building LL shop lines. This totals about 150 tons daily. One foreman on each

shift supervises these activities in his area along with his other responsibilities.

Since the inception of the salvage program in 1950, the actual weight of the piece parts made. not including the weight of any trimmings removed during the salvage operations, has increased from less than 100,000 to about 1,000,-000 lb. per month. During the two-year period ending June 30, 1952, the number of work orders utilizing salvage had increased from 0 to 27.35 per cent of all work orders. Today it averages about 35 per cent.



CHAMPION E-X-P-A-N-D-I-N-G MANDRELS

The expanding sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. Champion Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of .010". Available in regular sizes to fit holes from ½" to 3" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from 1/3" to 91/3" diam.

CHAMPION Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.

WESTERN TOOL & MFG. CO., INC.
Our 53rd Year • Dept. 28 • Springfield, Ohio

ONLY DIEBEL PRESSES HAVE THE EXCLUSIVE



STOPS ABNORMAL DIE DULLING

Misalignment of punch and die because of inadequate gibbing is the major cause of abnormal die dulling and short die life. The V-shaped gibs on conventional presses do not offer enough guiding surface, regardless of length, to assure positive alignment in day in day out mass production.

Diebel's cylindrical ram design affords maximum guiding surface and guarantees accurate punch and die alignment.

The exclusive cylindrical ram is another proof that DIEBEL PRESSES are designed, engineered and built with the die in mind.

DIEBEL HI-PRODUCTION PRESSES



Compare the tremendous amount of precision guiding surface of the cylindrical ram with the V-shaped gibs that guide the ram on conventional presses.



DI MACHINE CORP.

2714 W. IRVING PARK ROAD . CHICAGO 18, ILLINOIS

The number of pieces cut from salvage for production purposes only has increased from about 100,000 in 1949 to about 550,000 at present. Besides this a large quantity of pieces are made each month for departments such as welding training, toolroom, maintenance, and all the vocational schools in the area.

At the present time, a total of 544 different parts are regularly made from coded salvage material. In addition to these, a great number of other parts are completed each month from surplus coded salvage or from uncoded sources.

Wherever and whenever a piece part of irregular dimensions is stamped from a piece of steel, there is almost sure to be salvageable material left. In many cases, it is as much as or more than is used to make the original part.

From these coded salvage pieces, all the way from 1 to 15 different parts are made from each piece, with from a total of 1 to 50 pieces from each. By using the salvage material rather than regular material, all the way from 1 to 13 operations are saved.

For instance, from one original piece of steel $\frac{3}{8}$ x 18 x 18 inches, only one coded piece of salvage can be made. This coded piece is $2\frac{3}{8}$ inches wide and 12 inches long. By using this piece of salvage, two operations are saved on the production shears.

On another operation, the original part is made from a blank $\frac{3}{8}$ x 22 x 48 inches. The part is of irregular dimensions and leaves three pieces of salvage of different shapes. From

STOP DUSTS Instantly

with

DUSTKOP

Available from stock of 22 standard models

300 cfm to 10,000 cfm

FOR: Surface Grinders, Tool and Cutter Grinders; Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Eqiupment . . . DUSTKOPS collect almost all kinds of industrial dusts.

Ask for Catalog 605-2. Describe dust problem for recommendation by return mail—no obligation.



AGET-DETROIT CO. 207 Main St. Ann Arbor, Mich.

Standard Super Duty Snagging Grinder Speeds-up Casting Output At Aluminum Industries, Inc.

HIGH PRODUCTION IN ACTION

Standard Type 55 Super
Duty Snagging Grinders come in sizes up to

Sliding down twin chutes, cast aluminum pistons at Cincinnati, Ohio, plant get fast rough-grinding at one of two independent work stations.

Differing work loads for each side wear wheels to different diameters, but both wheels on this Type 55 Grinder operate at their separate correct peripheral speeds.

For complete information write for Catalog.

100 hp with 20" to 30" wheels.

FOUNDRY GRINDER DIVISION

the STANDARD electrical tool co.

2487 RIVER ROAD . CINCINNATI 4 . OHIO

these three coded pieces, four part pieces, each $8\frac{1}{2} \times 9\frac{5}{8}$ inches, are made from each of two coded pieces and 2 part pieces $2\frac{3}{8} \times 11\frac{5}{8}$ inches from the other coded piece, a total of 10 part pieces. In cutting all these, there is still one operation saved on the production shear over what would be necessary when cut from original rather than salvage material.

Another part of a very irregular shape is cut from a blank $\frac{3}{8}$ x 55 x 52 inches. From the resulting five pieces of coded salvage, five different dimensions for parts are made: one piece $6\frac{5}{8}$ x 10 inches; one piece $6\frac{3}{4}$ x $7\frac{3}{4}$ inches; one piece $9\frac{1}{8}$ x $13\frac{1}{4}$ inches; four pieces each $2\frac{3}{8}$ x $8\frac{1}{8}$ inches; and 16 pieces each 2 x 3 inches, a total of 23 pieces. Even with all the shearing necessary, 5

operations are saved.

irregular trimming. This is

cut into 9 coded pieces and these cut into 21 piece parts as follows: 1 piece 10 x 12

inches; 1 piece

73/8 x 9 5/16 inches; 1 piece

111/8 x 131/4

inches; 1 piece 2 x 12 inches; 2

pieces 8½ x 83/8

inches; 2 pieces

x

inches; 2 pieces

21/2 x 4 inches:

3 pieces 2 x 5 inches; and 8 pieces 2 x 2½ inches. Notwiths t and ing the number of cuts made for these.

still a total of

101/2

41/2

On another operation, an original part is stamped from a $\frac{3}{6}$ x 40 x 65-inch blank, leaving an



- We stand behind every product we manufacture.
- We assure IMMEDIATE delivery.

DEPENDABLE DURABLE

Largest assortment in the Industry. Economize . . . use them as standards. All precision made of heat treated selected steel, cadmium plated and corrosion resistant mid-nite black finish. Individual parts on assemblies may be purchased separately.



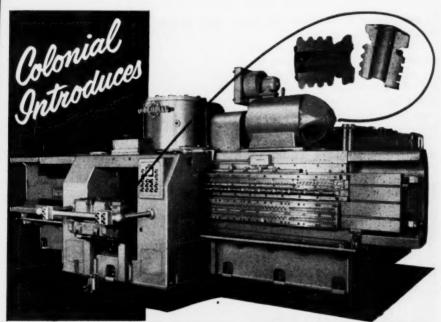
WRITE TODAY

For Catalog of our complete line, includes full size tracing tomplates of each product. Save tooling and designing costs.



MORTOU MACHINE WORKS 2421 Wolcott St. Dollar 29 Mich.

Save teeling and designing cests,



the MECHANICAL HORIZONTAL

The model HM-25-130, is the first in a new line of Colonial MECHANICAL HORIZONTALS. It removes 3½ pounds of metal, with depth of cut varying from 5/32 to 3/16 of an inch, in a 21-second broaching cycle from two cast iron bearing cap clusters. Tungsten carbide-tipped tool bits mounted on the 24" wide ram, travel at more than 140 feet per minute. The machine broaches on both the forward and return strokes, doubling the length of cutting action as compared to ordinary broaching. The machine has a 130-inch stroke and 25-ion capacity. Broaching speed is variable (30 to 150 sfm) through rheostat control of the direct current 150 hp motor.

Trunnion-type fixture has hydraulic clamping, positioning, and shuttling. All automatic cycle hydraulic and electrical controls are interlocked, and this equipment is installed according to J.I.C. standards. Table level loading of work and floor level accessibility of the broach inserts and practically all operating parts are important features of the machine. Floor space is 194 x 290 inches.

This is a Colonial Unified Broaching Installation.











11 operations is saved on the production shears.

The greatest number of piece parts from the salvage of one original part amounts to 50 pieces. These are of 15 different dimensions and result from four coded pieces of salvage left from an original part cut from a $\frac{5}{8}$ x 27 x 47-inch blank. There is one piece part 10 x 10 inches; 1 part $\frac{51}{4}$ x 17 inches; 1

part $1\frac{1}{4}$ x 5 inches; 2 parts each 7 x $7\frac{3}{4}$ inches, 6 x 16 inches, and $3\frac{1}{2}$ x $3\frac{1}{2}$ inches; 3 pieces each $4\frac{3}{4}$ x $4\frac{3}{4}$ inches, 5 x 5 inches, and 3 x 7-11/16 inches; 4 pieces each 3 x $4\frac{3}{4}$ inches, 3 x 6 inches, and 3 x $5\frac{5}{8}$ inches; 6 pieces each 3 x $6\frac{1}{2}$ inches and 6 x 6 inches; and 8 pieces 2 x $5\frac{1}{4}$ inches. Thirteen operations are saved on the production shears by cutting these from scrap.

Precise

LOWEST COST

PRECISION

FOR TOOL ROOM AND PRODUCTION

UP TO 45,000 R.P.M. AND 1/4 H.P. ON AC/DC. Only PRECISE has the speed, power and precision needed to turn Tungsten Carbide Mills as well as all other rotary tools with shank diameters to 1/4." Grind, mill, finish, polish any material from wood to the hardest alloy steel. MODELS SUPER 30 and SUPER 40 are for hand applications or machine set-ups; PRECISE SUPER 50 is for heavy duty in machine set-ups. Precision quills and chucks; lifetime-lubricated, micro-precision bearings; machined metal housings. Mounts and accessories for each model extend versatility on standard machine tools.



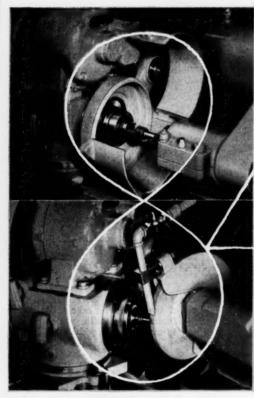
PRECISE SUPER 30
45,000 R.P.M.
and Vs H.P. in 35
oz. Draw collet.

Write FOR CATALOG

PRECISE PRODUCTS CORP. 1345 Clark St., Racine, Wis.

When errors are made by emplovees in measurements of parts, these are usually caught by inspection before an entire run is made. If not caught, then they are discovered by the salvage department because the resulting salvage intended for coding is not the right size. Salvage resulting from error is not coded because there will likely be but one run of

Caterpillar's salvage program is not a one-man or a one-department job, comments Mr. Ehrett. In spite of all the accomplishments made,





MODEL 84

EXTERNAL GRINDER



This small hole grinder mounts interchangeable wheelheads for internal and external spindles. Hole capacity is 3" dia. with a maximum depth of 4"; external is to 3" dia. by a 4" length. Collets and step chucks mount directly in lathe-type spindle.

This flexibility combined with the inherent accuracy is why the Rivett 84 has gained great popularity in toolrooms since its introduction to the trade twelve months ago.

Quick and easy to set up, the 84 will handle your diversified jobs faster, too. All the details to prove this are shown in Catalog No. 84-A. Write for a copy today!



RIVETT LATHE & GRINDER, INC., DEPT. MMR5, BRIGHTON 35, BOSTON, MASS.



A Clemson exclusive.

You'll find it has all the high-speed cutting qualities of the original Star "Moly" High Speed Power Blades, plus being highly break-resistant. Best of all, no premium cost.

Call your Star distributor today for a trial lot of Star "Molyflex" High Speed Power Blades. Rely on him also for hundreds of the other supplies you need regularly and quickly to keep your production going.

Sold Only Through Recognized Distributors.

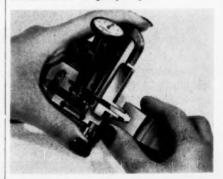


CLEMSON BROS., Inc.
MIDDLETOWN, N. Y., U. S. A.
Makers of Hand and Power Hack Saw
Blades, Frames, Metal and Wood Cutting
Band Saw Blades and Clemson Hand and
Power Lawn Machines.

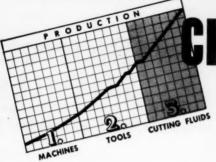
there is still room for a lot of further development. Just how far it can be extended, and just how much the savings can be increased, depends upon how well every workman and every supervisor keeps alert to finding better ways to do things and how closely all other departments coordinate their efforts with the salvage problem. What happens in these endeavors in the future is likely to be even more astounding than what has already been developed. Yes, I-Tab-Wodi has been very successful in finding better ways of doing it.

Snap Gage for "Christmas Tree" Serrations

FEDERAL Products Corp. has developed the portable adjustable snap gage illustrated herewith, which is designed to measure the widths of "Christmas Tree" serrations in a jet engine compressor rotor disc. Fully insulated from heat by a wrap-around pregwood handle, the gage is said to measure all three rows of blade serrations regardless of their angles. The illustration shows the gage being used to measure a cross section of only one rotor disc. In actual use, however, the gage is applied to a large workpiece containing numerous such serrations on its periphery.



For maximum efficiency...



HECK ALL THREE



MACHINES

Several machines in your plant may be capable of performing the job at hand. You may consider two or three machines or even make test runs before deciding which is best. DO YOU ALSO CHECK SEVERAL CUTTING FLUIDS?



TOOLS

Carbon steel tools may do the job— but you don't hesitate to try high speed steel or carbide tools if there is a chance they can do better. DO YOU ALSO CHECK SEVERAL CUTTING FLUIDS?



CUTTING FLUIDS

CHECK SHEAR-SPEED Soluble Oil against your present cutting fluids and convince yourself of its amazing advantages and versatility... a multi-viscosity blend for widest range of application. It's SEVERAL CUTTING FLUIDS ALL IN ONE. Avoids gumming characteristics of paraffin oils and corrosion or staining from sulfur and chlorine additives. Sold only on a satisfaction guaranteed test basis. Write today for Bulletin SO-53 and price list.



impartial tests of three cutting fluids conducted in the plant of alargeauto manufacturer shows a finite continuous manufacturer shows an increase in tool floor of 60,50% SPEXD. So for the new SHEXD. So for the new SHEXD of the fluids of th

On this high speed hobbing operation turning out automotive sears SHE,R-SPEED Soluble Oil tool grind the sear of the search s



7125 E. McNICHOLS RD. A Division of Michigan Tool Co. DETRUIT 12, MICH.

DOUBLE WELDED

for GREATER SAFETY

Shatterproof, Extra Strong Body Makes It Practically Unbreakable

GREATER PRODUCTIVITY

High Speed Steel Welded Edge Gives More, Straighter Cuts Per Blade

Starre CKSAW BLADES

Double welding makes this great new power blade the safest, straightestcutting, longest-lasting hacksaw you can buy. Use it with complete safety for your toughest cutting jobs - for multiple sawing or interrupted cuts. Step up the teed and speed and watch it breeze through work that shatters ordinary blades.

Double welded construction as featured in these new Starrett SAFE-FLEX Power Blades gives you a cutting edge of hard high speed steel, reinforced with a mediumhard, extra strong center and backed up by a super-tough steel back. This ideal combination is integrally welded by modern methods to make a far stronger blade with a perfect balance of hardness and toughness.

Ask your safety engineer and production supervisors to look into this great new blade. Order some today through your Industrial Distributor.

-1804 - 76 x .072-47 Starrett

THROUGH YOUR

TTERPROOF!

DOUBLE-WELDED FOR SAFER, STRAIGHTER, FASTER CUTTING

Medium-Hard Steel Center Fo Extra Strength

THERE IS A STARRETT HACKSAW BLADE FOR EVERY JOB HAND AND POWER SIZES. FOR COMPLETE INFORMATION, WRITE FOR STARRETT HACKSAW CATALOG MD

AND PRECISION INSTRUMENTS - DIAL INDICATORS - STEEL TAPES ON GROUND PLAT STOCK - NACKSAWS, BAND SAWS and SAND KNIVES "WORLD'S GREATEST TOOLMAKERS" THE L. S. STARRETT COMPANY, ATHOL, MASSACHUSETTS, U. S. A.

Visit The STARRETT Exhibit - Booth No. 18 - NATIONAL QUALITY CONTROL CONVENTION, ST. LOUIS, June 9-11

LOGAN ..

a national participant in major fluid power advancements

SINCE 1916

Kentucky Derby . . . popular national event where racing champions are made as capacity crowds cheer for their favorites.

AIR-DRAULIC® FEED-CONTROLLED CYLINDERS LOGAN

POWER MOVEMENTS IN ANY DIRECTION - NO POWER UNIT REQUIRED

COMBINES

the fast-acting, economical, low pressure operation of

AIR-

with the smooth, uniform controlled regulation of

-OIL-

STANDARD MOUNTING TYPES

Standard bores from 3" to 8". Any stroke to 5 feet. For air pressures to 150 p.s.i.

Furnished for controlled feed with rapid return in either direction, or with con-trolled feed in both directions. Skip-feed movement can also be provided.



LOGAN MANUFACTURES 6,975 STANDARD CATALOGED ITEMS

FREE CATALOG ON REQUEST

AIR CONTROL VALVES, Cat. 1004 ... AIR CHUCKS, Cat. 78-1 ... AIR CYLINDERS, Cat. 108-1 ... AIR-DRAULIC CYLINDERS, Cat. 108-2 AIR AIR AIR AIR CHUCKS, Cat. 208-5 ... AIR CHUCKS, CAT. 208

LOGANSPORT MACHINE CO., INC., 201 CENTER AVE., LUSANSPORT, IN

THE

GIII/01/18 LINE OI

0 0

SPUR CUTTEI for 6A Gear Shap

SPUR CUTTER
for 100- or 120-in. Gear Shape

HELICAL CUTTER for 36-Type Geer Shape HELICAL CUTTER for 6A- or 7A-Type

MACHINES AND TOOLS

delivers Quality Control in All Sizes...



responsibility has great practical advantage when costs depend on holding work to predetermined limits.

The Fellows Sales and Engineering Staffs at Branch Offices and at Headquarters are men of broad experience and practical skill in helping customers combine specified accuracy with close control of costs. All Fellows Offices are at your service.

THE FELLOWS GEAR SHAPER COMPANY

Head Office & Export Department: 78 River Street, Springfield, Vermont Branch Offices: 319 Fisher Building, Detroit 2, Michigan . 5835 West North Avenue, Chicago 39, Illinois 2206 Empire State Building, New York 1, N. Y.

Sectional Rack For Bar Stock Storage

. By H. G. FROMMER

The author describes an interesting design of storage rack featuring unusual flexibility, and illustrates and clearly explains how such a rack can be constructed.

THE accompanying illustrations, Figs. 1 and 2, show a sectional rack which is designed to increase the speed with which bar stock may be stored for future use. When a bar shipment arrives in the plant, the first two sections of the rack are placed on the floor, and the entire

bundles of stock can be lowered onto the sections from the top, thereby eliminating the tedious insertion of single bars. The next two sections of the rack are then nested on top of the first two sections, and the process is repeated.

The flexibility of this design is

a p p r e c i a ted when stocks are low and the floor space is required temporarily for other purposes. With the help of special lift frames, such as shown in Fig. 3, it is possible to lift one or more sections of the rack off

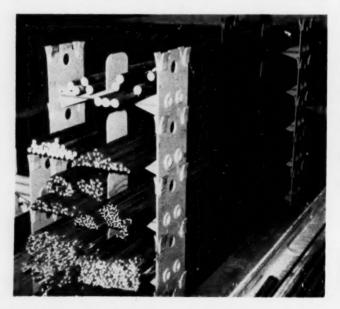


Fig. 1 — Sectional rack, five units high, provides large capacity together with flexibility in storing bar stock.

to permit removal or addition of whole bundles.

Primarily designed for lighter bar stock to permit the removal of single bars by hand, the rack, however, may be used for heavier bars since it can be serviced by overhead cranes or hoists. Construction of the rack is easily effected. The side

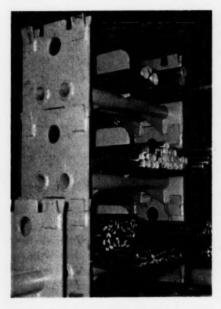
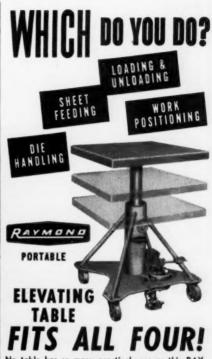


Fig. 2 — Close-up view of sectional bar rack showing stacking and nesting features.

plates are flame-cut to contour, as well as the holes. Pieces of pipe are inserted through the two lower holes and welded to the sides. Four slightly bent lugs are welded to the sides along the top edges to facilitate accurate nesting and to prevent the units from shifting. A spacer plate near the center of the pipes divides the storage space. The top holes in the side plates are for lift-



No table has so many practical uses as this RAY-MOND Portable Hydraulic Elevating Table! Use it for positioning or handling throughout the plant . . see how it lightens your work load. RAYMOND Hydraulic Elevating Table has sturdy 30" square top which can be rotated when desired.

Convenient foot pump simplifies raising and lowering, leaves operator's hands free. Smooth-rolling casters make table highly portable. Floor lack holds it securally in place. Standard Model elevates from 28" to 44"; Telescopic Model from 28" to 50". Both models have 2,000 lb. capacity.



The RAYMOND CORPORATION

3937 Madison St., Greene, N.Y.

Please send me Bulletin 233 on your Portable Elevating Table.						
NAME	TITLE					
COMPANY						
STREET						

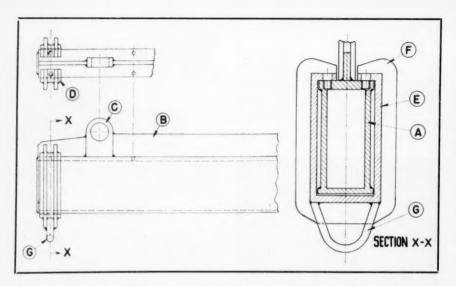


Fig. 3—Drawing of special lift frame for lifting off one or more fully loaded sections of the rack shown in Figs. 1 and 2 to permit removal or addition of whole bundles. The left view shows one end of the frame with one of the two sliding hook holder assemblies. The right view is a cross-section through the frame, as well as through the hook holder assembly.

ing purposes. Small gussets beneath the pipes serve to transmit the load to the vertical members.

The special lift frame shown in Fig. 3 consists of a box section weldment, A, three gussets, B, and two ears, C. Several sets of two drilled and tapped holes are provided along the top surface of the frame.

Each of the sliding hook holder assemblies, D, consists of a box section weldment, E, which is partially open on top. Two gussets, F, add strength to the weldment, while a loop, G, serves to hold two lengths of chains with hooks on their lower ends. (Chains and hooks are not shown.) Two holes on the top surface of weldment E match the tapped holes of weldment A. Two threaded pins (not shown) pass through the holes of weldment E

into the holes of weldment A.

The purpose of this arrangement is twofold. In the first place, since the slide D is adjusted lengthwise along the frame so that the distance between both slides is approximately the same as the distance between two sections of bar rack, the pins serve to hold these slides in their correct location. Secondly, the pins also prevent the spreading of weldment D in case of overloads, as the pins would be sheared off before weldment E could slip off weldment E

The lifting frame is suspended from the overhead crane by means of a two-piece chain, the upper ends of which terminate in a lift ring, while the lower ends are fastened to the ears C by the use of welded endrings.



These fine files typify

QUALITY

that can be easily seen—

readily proved in use—

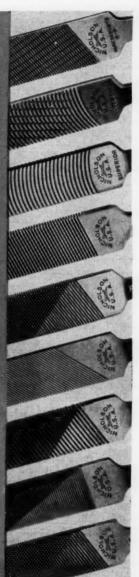
noticeably shown in longer file life, better work, higher production, lower operating costs

"File Filosophy"—FREE 48 illuminating illustrated pages on kinds, use and cure of files. Send for B.



MICHOLSON FILE COMPANY

48 Acorn St., Providence 1, R.J. In Coneda: Hithelean File Company of Coneda Ltd., Part Hope, Ont.



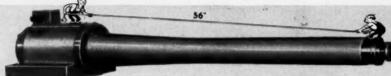
NICHOLSON FILES god event - undo.

YOU CAN Specify POPE PRECISION SPINDLES WITH CONFIDENCE

TAKE THESE DEEP HOLE SPINDLES, FOR EXAMPLE

Only POPE Deep Hole Spindles are equipped with tapered bore, double row, cylindrical roller bearings close to the wheel for maximum rigidity.





POPE <u>Deep Hole</u> Spindles produce <u>more holes</u> per day because they can take heavy cuts; <u>superior finished</u> holes due to their shaft and bearing construction and Pope precision craftsmanship. Pope Spindles are <u>dynamically balanced</u> with all rotating parts in full assembly to insure smooth running and good grinding results.

Pope P-5886 Motorized Deep Hole Spindle — 75" overall length, 4" barrel diameter at the wheel end, 6" at the motor



LUBRICATION — Pope System. The bearings are permanently lubricated for their entire operating life and require no further attention.

Pope P-16022 Belt Driven Deep Hole Spindle



If a fly lit on the inside surface of that deep hole, it's so smooth he'd fall down and break his leg.



Ask for detailed specifications and prices on Pope Heavy Duty Deep Hole Precision Spindles.

No. 98

pecify POPE

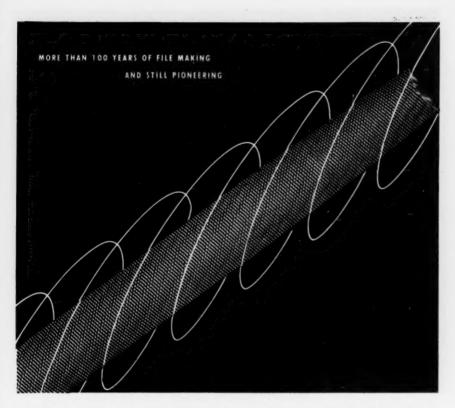
POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET . HAVERHILL, MASSACHUSETTS

PRECISION SPINDL

— an actual comment made by the operator of a Pope Deep Hole Spindle to a



HELLER WAS FIRST WITH SPIRAL-CUT HALF ROUND FILES

Ordinary half round files require a skillful twisting of the file to produce smooth, even work. Heller engineering has removed this human element from good file performance with exclusive Spiral-Cut Half Round Files. The necessary "rolling action" is designed right into the file. This new cutting principle is typical of Heller's continuous search for better files. By constantly testing, inspecting, improving . . . Heller guarantees file users "the best."

other Heller Tilst

NUCUT* Wavy-Teeth Files VIXEN Milled Curved Toeth Files WAVY-TEETH* Double Cut Mill and Saw Files

*Registered T.N



THESE 3 FAMOUS BRANDS ARE MADE ONLY BY

HELLER BROTHERS CO. America's Oldest File Manufacturer NEWCOMERSTOWN, ONIO

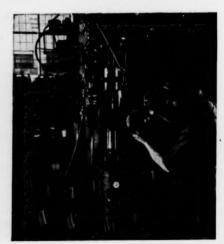
H STANCE 18 19

YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS







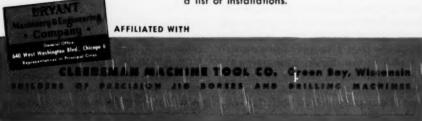


costing too much? NOT WITH CHEMAN DRILLING MACHINES

Low cost holes require working drills at top efficiency. The built-in capacity and power of Cleereman Drilling Machines is greater than needed today with reserve for the tools of tomorrow.

- **■** Operate at maximum speeds
- **■** Operate at maximum feeds
- Operate with maximum convenience
- /Operate with minimum maintenance

There is an enthusiastic user near you. Ask him about his hole cost. We will gladly furnish a list of installations.



Two-Position Reversing Milling Fixture

The author presents details of an interesting fixture for holding four pins while milling the ends.

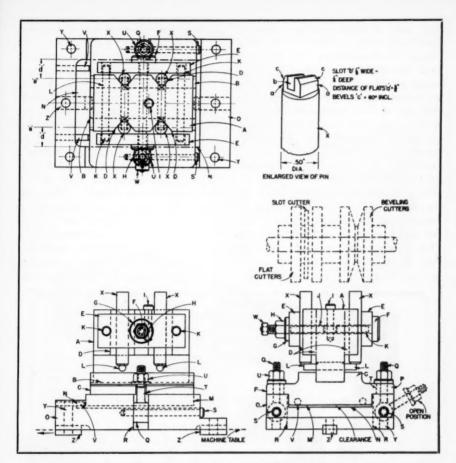
X/ITH the manufacture of a large number of small size cylindrical pins of the type illustrated at X in the enlarged view in the accompanying drawing, several serious objections arose in connection with the milling operation required to produce the unusual shape of slotted and beyeled formation at one end. The component consists of a parallel cylindrical pin, in mild steel, 1/2 inch in diameter x 27/8 inches long overall. The latter dimension was held to close tolerance at the parting-off operation performed in an automatic screw lathe. Variations in the outside diameter of parts were similarly held to close limits—plus or minus 0.0005 inch-by a simple grinding operation prior to milling.

The critical milling requirements are specifically shown. These embrace the production of a slotted and beveled rectangular formation at one end of the pin. This comprises two flats a of equal length and depth and situated diametrically opposite, being formed so that the remaining rectangular portion will be central with the pin. This portion is slotted as at b to the dimensions given, the width and depth having to be held to close limits. This slot is also situated centrally so that both flattened side walls are the same thickness.

The extreme tip of the formation is beveled each side in equal manner, with the resulting inclined flats *c* producing a 60-degree included angle.

The entire slotted formation is not only to be accurately centralized with the cylindrical portion of the pin, but flats a and slot b must be parallel with the length axis of the part as shown. For milling this end of the pin, two setups were initially employed involving the use of two small milling machines and two separate holding fixtures. At the first milling stage, a single pin component was mounted in the simple fixture for machining the two side flats a and the center slot b, these being produced by a gang of three cutters on the machine arbor. The parts were then transferred to the second machine and set up in the other fixture for milling the beveled flats c.

Several difficulties were encountered with this method and use of two distinct fixtures. Because of having to mount each part successively in the two fixtures, a considerable amount of time was involved in setting, which, in fact, was found to be very much greater than that required for the actual milling of parts. After milling flats a and slot b in the first fixture, parts had to be sort-



Drawing of two-position reversing fixture designed for holding four pins while milling the ends

ed and deburred to facilitate feeding and mounting the second fixture, causing additional time to be wasted by such handling of pins. When setting up partially machined components in the second fixture, considerable care had to be exercised to ensure that parts were positioned in the correct radial manner relative to the rectangular milled portion in order that the inclined flats c would be machined correctly in line with portions a. This setting requirement was in practice the source of a great deal of trouble, and an unduly high proportion of finished parts was found to be defective or scrapped as a result of excessive misalignment of the respective flat formations.

To achieve greater economy and simplicity in setting, greater accur-

acy, and a reduction in defective and scrap rates, a fixture of the type shown in the drawing was designed and successfully adopted to overcome all the above objections. The principal advantage derived from the use of this improved design of fixture was that four pins could be mounted, secured and completely finished at a single setting. The fixture was provided with a simple 180-degree indexing or reversing action so that pins could be presented successively to a gang of cutters for machining the side flats a, the center slot b, and the beveled flats c in the simplest and most rapid manner, without having to disturb the setting of any pin in the fixture.

Design and Construction of Fixture

The improved fixture possesses several unique yet highly practical features which doubtless will prove of interest to jig and fixture designers and machinists because of their simplicity and effectiveness and the ready application with other designs of fixtures, and so on. Referring to the drawing, the fixture comprises a hardened steel body. A. substantially tee-shape (see end view at the lower right-hand corner). The narrowest portion on the underside is very tightly press-fitted into a parallel shallow slot, B, machined along the top of the rectangular hardened steel plate, C. The body is permanently retained to the plate by means



... the speed, steady output and the way they can "take it" in severe service. And ... you'll be pleasantly surprised with the cost, the quality and the very low maintenance.

Rousselle presses are not ordinary, run-of-mine units. Everything about them stresses ruggedness and simplicity—precision machining—expert assembly. And they're so simple to handle and maintain—and so very

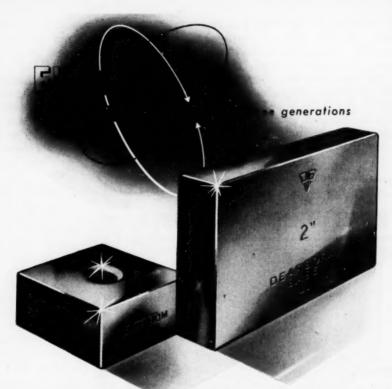


versatile. You can shear, punch, bend and form metals; cut and punch paper; form and trim fibre, plastics and other materials.

Often considerable savings are possible if you let our engineering staff assist you. No obligation. Simply explain problem and send sample or drawing of work.

Rousselle Presses are sold exclusively through leading Machinery Dealers and are Manufactured by

SERVICE MACHINE CO. 7627-33 S. Ashland Ave., Chicago 20, III.



No finer GAGE BLOCKS at any price!



By any comparison you care to make . . . block-for-block, set for set . . . you'll find Ellstrom Chromium Plated Standards truly outstanding in the field of precision measurement. They are precisely treated and thoroughly tested for coefficient of expansion, uniform hardness, and metallurgical stability. The durable chromium plated gaging surfaces are applied and finished by special Ellstrom methods which assure you of greater serviceability, longer wearing millionths. And flatness, parallelism, and specified accuracy of each individual block is fully certified by the most uncompromising final inspection found anywhere in the industry.



So next time you need gage blocks, specify Ellstrom Standards. Furnished in 28 basic sets, either square or rectangular styles, with block sizes in step series from .010" up to and including 20.000". Basic accessories also available . . . plus tungsten carbide wear blocks and individual blocks. New Ellstrom Standards Catalog contains complete specifications and prices . . . send for your copy today.

ELLSTROM STANDARDS DIVISION

Dearborn Gage Company . 22035 Beech Street . Dearborn, Michigan



Originators of Chromium Plated Gage Blocks

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

of a number of cap-headed screws which, for the sake of clearness, have been omitted from present diagrams. The upper (widest) portion of this body has four identical V-slots, D, each of 90-degree included angle and all the same size. These slots are situated two in each long side of the body, each pair being exactly opposite and perpendicular to

the plate C. These vees are for holding the set of four pin components X, one pin in each set in upright position as shown.

The pins are secured within their respective vees by means of two rigid hardened steel clamp plates, *E*, situated one at each side of the upper portion of the body. The two members are drilled with a clearance

size hole in the center for the shank of a locking stud. F. which is located in a horizontal hole drilled through the body about midway between the two pairs of vees. The stud has a large circular head to bear against the rear clamp plate. On the front threaded projecting end of the stud is a large diameter thick hardened washer. G. and lock nut. H. When the latter is screwed onto the stud, both clamps will be drawn inward equal amounts to grip the set of four pins in the vees. The stud is prevented from turning within the body





arimatic

SUPER SENSITIVE
VARIABLE SPEED • SMALL HOLE
PRECISION

drilling machine

SINGLE OR MULTIPLE SPINDLES

to drill holes (.004" to 5/16") in

all drillable materials, to the most
exacting specifications and on the most
relentless production schedules.

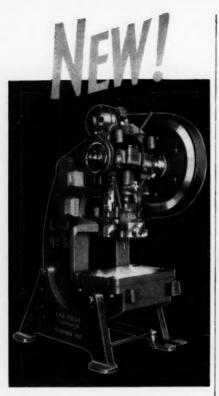
Get prices and specifications without obligation.

ASK FOR FREE BULLETIN 5407

Address The Hamilton Tool Company 828 South Ninth Street Hamilton, Ohio







65-ton L&J Press

New No. 6 press featuring greater efficiency—lower production costs—heavy rigid frame—extra deep throat—replaceable bronze bushings in main and upper ram bearings—buttress threads on ram screw—hard bronze ball seat—roller bearings in flywheel or main gear and backshaft mountings—long, precision-scraped gibs—air clutch available. Also made in backgeared model. Other sizes 6 to 80 tons. Write for literature.



when nut H is adjusted by means of a small headed pin, I, tightly secured in a vertically drilled hole through the body. The side of this pin bears very lightly against a shallow short flat, J, machined across the adjacent side of the stud shank. The stud may thus move a short distance through the body but will be unable to rotate therein.

The clamp plates E are retained in the correct horizontal position by the engagement of two pins, K. which are tightly fitted within holes at each end of the body well beyond the vees. The pins project an equal amount at each long side of the body; i.e., slightly less than the thickness of the clamp plates. Each projecting portion of the pins engages easily within a clearance size hole drilled through each end of both clamp plates as indicated. Thus, the two opposed plates will be free to move toward or away from the long side of the body the necessary amount for locking or releasing workpieces in the vees, under impetus of the stud or nut, but cannot swivel radially beyond the small amount permitted by such clearance between holes and pins.

The height setting of pins X is determined by two more hardened steel pins, L, passing completely through the body at right angles to its longest sides. These pins are press-fitted into the body or may be secured by other convenient means. Each pin projects a certain distance at opposite sides of the body immediately underneath each vee formation. A shallow flat is formed across the top side of these projecting portions to provide a sufficient registering surface for the end of pin com-

MON

CUT COST

OF PRECISION GEAR PRODUCTION

THIS FEATURE: "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

AND ENABLES the users of this machine to vary speed and feed to suit the material being machined.

THIS FACT, and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

contributes to more gear precision with no sacrifice of gear production,

OR INCREASED gear production with no sacrifice of gear precision, OR BOTH!

Prices and specifications without obligation

ASK FOR FREE BULLETIN 5410

Address

The Hamilton Tool Company 828 South Ninth Street Hamilton, Ohio Hamilton Tool
USE IT WITH CONFIDENCE

ponents, the latter simply resting thereon as shown.

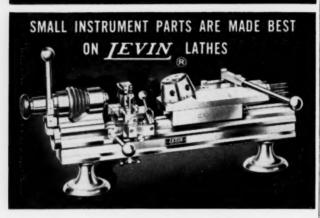
On the underside of plate C is a rectangular extension, M, the long sides of which are parallel and central with the body secured on top. This extended portion is about $\frac{1}{2}$ inch in depth, and is a close slip fit within a rectangular slot, N, machined across the top of a cast iron

base plate, O. The length and width dimensions of the latter are considerably greater than the overall dimensions of the plate C. The slot therein is also longer than in plate C for clearance purposes. At its right-hand end the slot passes fully up to the stepped side portion of the base plate, and at the opposite end a clearance of about $\frac{1}{2}$ inch is

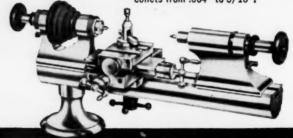
left between the slot end and side of plate *C*.

Plate C has an extension ledge. P. on each side. The underside of each of these portions is machined flat and square with the sides of the extension M so that they will bear in equal manner upon the top of the base plate. A small amount of clearance, as shown, is allowed between the bottom of slot N and the extension M to allow ledges P to bear upon the base plate.

Securing the plate C to the base are two identical ringhead bolts, Q, situated one at each long side with each ex-



Twenty-three models for all types of work. 4" swing, Bed Length 12" or 18"; over 100 stock sizes of collets from .004" to 5/16".



Send for Catalog L describing Lathes for tool work, second operations; turrets and full line of accessories.

LOUIS LEVIN & SON, INC., 3610 SOUTH BROADWAY, LOS ANGELES 7, CALIF.

do you WASTE MONEY RISK ACCIDENT doing things the HARD WAY?

your plant today and note how many assembly and maintenance operations are being done in awkward or tiresame

positions.



Imagine

THEM BEING DONE ON

PORTELVATOR

THE HANDY HAMILTON PORTABLE ELEVATING TABLE

With Portelvator hundreds of assembly and maintenance jobs are accomplished at the <u>right</u> height and in the <u>best light</u>.

And that means money in the bank and workmen on the job; faster work and fewer accidents.

Portelvator prices start at \$155.00—
place a couple at your workmen's
disposal and watch results.

Complete description in FREE Bulletin No. P-5403.

WRITE FOR IT!

Address The Hamilton Tool Company, 828 South Ninth Street, Hamilton, Ohio

IT'S A

amilton Tool

USE-IT WITH CONFIDENCE

actly central with the length of the plate. These bolts are anchored within slots, R, machined vertically in each long side of the base plate, and they fulcrum respectively upon two horizontally disposed hardened steel pins, S, inserted into the base plate from its stepped down end. Each overhanging ledge portion P has an open-ended slot. T, located centrally with bolt slot R and wide enough to admit the shank of the bolt. Collar nuts, U, on the bolts serve for clamping the two members securely together in the milling position.

It will be appreciated that member C and all body parts attached thereon will be aligned accurately in the transverse direction by the engagement of the extension M in slot N. To position the plate C in

the opposite (lengthwise) position are pins, V, which are located in the left-hand end of the base plate and project the required distance into slot N. By pressing plate C against these pins, the bolt slots R and T will be instantly aligned.

To prevent the lock nut H from being retracted an excessive amount when releasing a set of workpieces X after milling, the front end of locking stud F is reduced slightly in diameter, and a small stop collar, W, is cross-pinned thereon. This limitation of the screwing movements of the nut prevents accidental removal of that member and the disturbing of the mounting of the two clamp plates.

The bottom of the base plate O is machined absolutely flat and parallel with the bottom of slot N for

HARTFORD TRIPLE ACTION CUTTING and TUMBLING BARRELS



For uniform cutting down, wet or dry grinding, tumbling, pulverizing and mixing, the unique de-sign of Hartford Triple Action Barrels saves time and money and produces better results. Hartford Barrels give a TRIPLE ACTION in tumbling the ma-terial, an "over and over, end to end, folding-in" motion combined, which quickly grinds off burrs, and finishes and smooths the general surface of any article in the load. These barrels

are available in two sizes, large and small, and with both motor and belt drive. Hartford also makes steel burnishing balls scientifically correct in design and material for each specific job. Bulletin on request.

2HS52

THE HARTFORD STEEL BALL CO. HARTFORD 6, CONN.

DETROIT Sw 5 TURNER 485 NEW CENTER BLOG

CHICAGO 1 VICTOR P. CLARK 605 W WASHINGTON BLVD

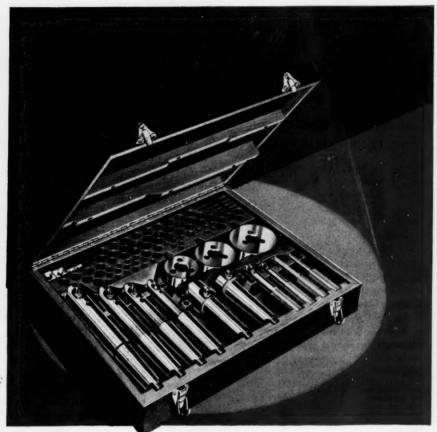
HEWARK N. I. BOYRUMIEL LEAZE BIDE 9/2 BR010 3T

LOS ANGELES CAL E D' MALTRY CO 1718 SOUTH FLOWER ST

EXPORT R A REDRIGUEL INC. 55 W. 42 NO ST . NEW YORK

Microbore STANDARD BORING BAR SETS

for use on all Makes and Types of Boring and Milling Machines



Discuss your tooling problems with our Microbore specialists Standard Microbore Boring Bar Sets are available in a wide range of sizes with Morse Taper or Milling Machine Taper Shanks

Send for new illustrated Catalog.

DE VLIEG MICROBORE COMPANY
480 Fair Avenue, Ferndale • Detroit 20, Michigan

mounting directly upon the milling machine table. A number of bolt holes, Y, are provided in the member for holding-down purposes, and the usual small locating tongues, Z, may be provided on the bottom for rapid location of the fixture to bring it in line with table T-slots.

Use of the Fixture

The drawing shows a set of four pins, X, mounted in readiness for

milling the slotted beveled formation. These are positioned by pins L so as to project the required distance above the flat top of the body to give proper working clearance to cutters, and so on. The base plate is permanently fastened to the machine table and remains undisturbed through the entire machining operations. Two sets of milling cutters are mounted on the machine arbor,

in the manner shown by light broken lines in the lower right end view diagram. The three cutters in the first set are arranged to machine the front pair of pins so as to form the side flats a and the narrow center slot b. The other set of angular face cutters machine the rear pair of pins to form the beveled flats c.

The first pass of the work through the cutters by traverse of the table produces two pins having the sides flattened and the center slotted, and a pair having only beveled faces c. Without disturbing the setting



THIN SHEET

EVEN I BEAMS

TO THE DESIRED LENGTHS

ON THE SAME MACHINE

IN LESS TIME!

STOCK

ATLANTIC SAW MFG. CO., Inc.

Brewery Street New Haven, Conn.

as it cuts - provides cool, free

operation throughout prolonged

blade life.

Send today for the graphic

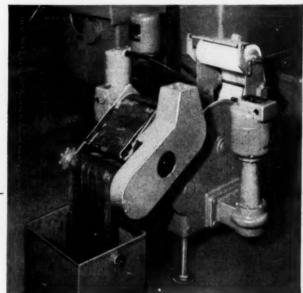
FREE

story of Atlantic's

family of

KEEP COOLANT SUPPLY FREE

FROM BOTH MAGNETIC AND NON-MAGNETIC ACCUMULATED SWARF





New BARNESDRIL
Kleenall Unit Installed
on Cylindrical Grinder.



BARNESDRIL KLEENALL UNIT

Volume-Cleans Magnetically Precision-Cleans By Filtration

All metallic sludge and abrasives are completely removed in Economical, Automatic Operation through rapid double cleansing action.

Write for full information

Ask for Bulletin No. 300E



BARNES DRILL CO.

860 CHESTNUT STREET . ROCKFORD, ILLINOIS

of any of the partially machined pins, collar nuts U are released about two to three turns, and ring-head bolts Q are swung outward in the manner shown by light broken lines to release plate C. This plate is lifted out of slot N, turned through 180 degrees, reinserted, and clamped within the base plate. A second pass of the fixture under-

neath the cutter then suffices to complete the formation on the end of all four components.

In order that the reversing movement of plate C always may be accomplished in such a manner as to maintain the four pin components central with their respective cutters, the distances d should be identical to very close limits. As will be seen

from the upper left - hand plan diagram, each dimension d is taken from the common center line e of a pair of pins, when mounted properly in their vees. to the adjacent edge of extension M on the underside plate C, or to the side wall of slot N in the base plate.

It will be appreciated that the simple reversion of plate C and the body and workpiece located thereon is much quicker than having to locate, set and clamp four pins in their respective vees so that they will be in the correct radial relationship. The introduction of this sim-



MODEL 1220

KALAMAZ00

METAL CUTTING BAND SAW

big, rugged, built for heavier production

MODEL 8C Cuts 8" round, 16" flat, 8" pipe.

MODEL 610 Cuts 6" round, 10" flat.

KALAMATIC AUTO-MATIC BAR FEED ATTACHMENT for Kalamazoo Metal Cutting Band Saws. Cuts 12" round, 20" flat stock. Accurate to thousandths of an inch, minimum burr and kerf. Four cutting speeds, four blade-tension adjustments for better sawing, longer blade life. Safety-designed throughout—only cutting section of saw blade is exposed. Positive power from heavy duty 1 HP motor. Available with coolant equipment.

Ask your dealer for details and demonstration.

MACHINE TOOL DIVISION

Kalamazoo TANK and SILO CO.
510 HARRISON ST., KALAMAZOO, MICHIGAN

5 MINUTES PER PIECE WITH THIS VERSATILE NEW HILLING MACHINE



Speeds fabrication of aircraft parts from 75ST aluminum alloy

HERE ARE THE FACTS ON THIS JOB:

Location: - Mar Vista Engineering Co., Los Angeles, Calif. Machine: 5 hp, No. 2, Model CH, Plain Style used with Universal Milling Attachment. Aircraft fitting for horizontal stabilizer. Material: - - - 75ST aluminum alloy. Cutter: -- - One blade - 8" fly cutter. Cutter Speed: - - - 875 rpm. 9 ipm feed.
Depth of Cut: - - - .050". Production: - 12 pieces per hour — all sides milled.

Investigate the versatile new CH line of milling machines. Their features are job proven to give you cost-cutting results plus greater productivity, better finished products. Contact our nearest representative or write : Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wis.

- CUT COST PER PIECE

Greater cutting efficlency - design refinements in 3-bearing spindle, a heavy duty, special forged steel gear.





Smoother feed per-formence, heavy duty 2"dia. table feed screw. 23% more bearing contact between screw nut.

Speed range — 16 changes from 25 to 1500 rpm, Extra-wide feed range— 16 changes from 1/4 to 32 ipm.





ple quick-acting fixture provided the means for effecting unusual economies on this otherwise difficult and protracted setting and milling job. The design and construction are especially simple from the viewpoint of the machinist, who is afforded full access to the work locating sites. It is also very easy to observe whether the lower ends of the four

pins X are seating down properly on the height-setting pins L. The locking of the four pins in their vees by a single nut is also exceedingly simple and rapid.

Since the vees in the body are situated perpendicular to the machine table, chips and metal particles will not easily adhere therein to cause misalignment or faulty clamp-



.

2199 E. 215T ST.

SPERMAN METAL SPECIALTIES

BROOKLYN 29, N. Y.

gear-cover removed)

For Those Who Are a Good Judge of Values

ONLY

Stops automatically on completion of cut. Automatic relief of saw blade on non-cutting stroke. 6" x 6" capacity using 10" x 14" blades. 12" x clutch pulley.

Pulley speed 120
r.p.m. Coolant pump base. Swivel vise for angle cuts. All steel welded base and table.

V-belt drive. Rigid frame. Gravity feed. Length gauge. Expanding clutch. 3-speed (90 to 130 r.p.m.) V-belt motor drive arrangement, \$32.21, less motors ½ H.P. 1725 r.p.m. motor recommended. Completely Motorized with Switch; Single Phase \$390.24; Three Phase \$397.03.

Order from your industrial supply distributor or order direct, giving name of your distributor. IMMEDIATE DELIVERY



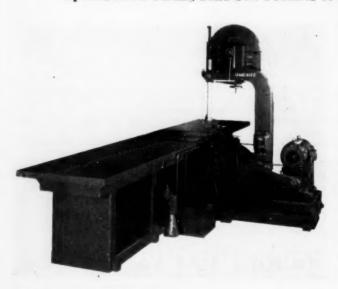
ing of parts. All the essential working and registering parts or surfaces are case-hardened to avoid wear and maintain the accuracy of the fixture over the longest period of use.

This present example of the fixture was specifically designed to deal with a large quantity of small pins identical in diameter and length and which had to be machined in exactly the same manner. It will, however, be appreciated that by a very simple modification to the V-slots D, coupled with a relocation of the height-setting pins L, work-pieces of considerably different sizes may be accommodated with equal facility. In the case of very large diameter pins, it would be advisable to employ two clamping studs for

operation on the side clamp plates *E* to obtain the required gripping pressure on components and to resist the heavy cutting forces.

Where a certain number of pin components in a batch have to be milled with flats and/or the center slot to different depths from those in the remainder of the batch, it would be more convenient to eliminate setting pins L. These members could usefully be substituted for by set screws threaded vertically into holes provided in the top of plate C and having lock nuts for securing them at any given height setting. Such an adaptation would then enable the operator to quickly alter the height position of pins so that flats or slots could be milled to a greater or less depth.

Special Metal Cutting Band Saw Features 19-Ft, Table



THE accompanying illustration shows an unusual band saw recently furnished by The Tannewitz Works, Grand Rapids, Mich., specifically for cutting off sections of cellulose acetate of 24-in. diameter but also adaptable for cutting off steel and aluminum structural members. graphite blocks. and a wide variety of other materials. Features include speeds of 900 to 2700 f.p.m. and 30in. saw travel hydraulic base.

Are you paying too much for

GRINDING...POLISHING SANDING...FINISHING?



"SKIL has the answer"

with more specialized types of Sanders and Grinders than any other manufacturer!

FOR EXAMPLE: Your men tire using heavy, out-of-date disc sanders—complain about lack of power to do the job right. SKIL has the answer in two new light weight SKIL 7" Disc Sanders with 30% more power?

FOR EXAMPLE: How many steps per day do your men waste going to a distant bench grinder? Break this "bottle-neck" with the new SKIL 6" Bench Grinders by spotting several of them around your shop in strategic locations.

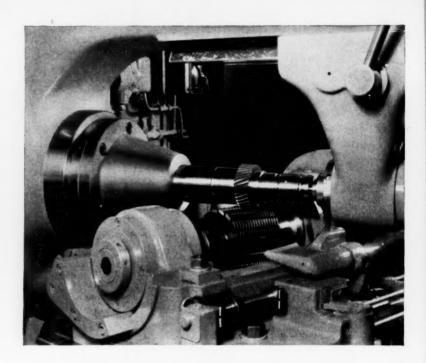


FREE! Let your SKIL Distributor prove to you—with an amazing demonstration and a free trial—"SKIL has the answer" to your metal finishing "bottlenecks."



Made only by SKIL Corporation formerly SKILSAW, Inc. 5033 Elston Avenue, Chicago 30, Illinois 3601 Dundas Street West, Toronto 9, Ontario Factory Branches in All Leading Cities

	enve, Chicago 30, Illinois
☐ I would like t	a demonstration and free trial
☐ Please send i	literature on SKIL tools
Name	
Name	
Name	



HIGH-SPEED HOBBING

INCREASES PRODUCTION AND TOOL LIFE

The Barber-Colman No. 14-15 Hydraulic Hobbing Machine is being used in several plants for hobbing of steel gears at speeds of approximately 300 SFM with an increase in both production and tool life. Although these speeds have not been considered practical until recently, the size, power and rigidity of the No. 14-15 Machine make it ideal for high-speed hobbing. Even with a standard hob slide, speeds of 300 SFM with a 5" hob are possible. However, most machines for high-speed hobbing are equipped with special heavy-duty, high-speed hob swivel.

The high-speed hob swivel is capable of speeds up to 950 RPM and is designed to accommodate hobs up to 7" diameter. The extra size and weight of this swivel provide the rigidity to maintain accuracy at high speeds. It is equipped with super-precision ball or tapered roller bearings. An automatic hob shifter may be furnished as extra equipment. High-speed hob swivels may be installed on recent machines in the field.

The jobs shown here indicate at least 200% increase in production, 100% better tool life, greater profile accuracy and equal or improved surface finish on the hobbed gears, hobbing at speeds of 300 SFM or greater. Using ground and unground hobs, gears were cut from a wide range of steels as high as 207 Br. hardness.

Although high-speed hobbing of steel gears is not used extensively as yet, it is used on enough jobs to prove that it is applicable under the proper conditions. Tests indicate that tool life increases until a speed of 200 SFM is reached, and then drops off rapidly to a speed of 250 SFM. After 250 SFM, however, hob life increases again until it is equivalent or better at 300 SFM than at 200 SFM. Materials on which satisfactory results have been produced include AISI 1113, 8620, 5135 and 4140.





	GEAR	STANDARD HO	B SWIVEL	HIGH-SPEED H	OB SWIVEL	% IN	CREASE
DP	No. Tooth	Cutting Time at 135 SFM	Pieces Per Shift	Cutting Time at 326 SFM	Pieces Per Shift	Prod.	Tool Life
6	36 Spur	10.64 min.	72	4.2 min.	161	253%	223%
6	35 Spur	11.62 min.	72	4.5 min.	151	258%	209%
	55 Helical	15.14 min.	50	6.94 min.	105	218%	210%
	62 Helical	26.8 min.	28	10.3 min.	72	260%	257%

Double Thread Hob, 5x5x2 Feed — .060"/rev.
Steel — AISI 8620 normalized No difference in surface quality
Profile and lead angle above average accuracy
SECOND SERIES OF TESTS

HOB Accurate Unground 9 D.P. 3-Thd. 5x5x2	GEAR 22 Teeth, Helical SAE 5135 170-207 BHN	SPEED 307 SFM	.045"/rev.
Same	Same	307 SFM	.070"/rev.

Climb Hobbing
Material — AISI 5135
Average lead error — at .070"
feed within .0006" in 13/16"
Total Composite Error — .002"
both feeds
Estimated Hob Life — 200 per

Estimated Hob Lite — 200 per sharpening Using same speed and feeds with conventional hobbing, resulting finish was not as good. Our Engineers have been working with our customers on high-speed hobbing and have helped to solve many problems. They will be glad to discuss the economy of high-speed hobbing to your specific job if you will submit your part print and production requirements to them.

Call your Barber-Colman representative or write direct to:

HOBS • CUTTERS • REAMERS
HOBBING MACHINES
HOB SHARPENING MACHINES



Barber-Colman Company

GENERAL OFFICES AND PLANT, 455 BOCK STREET, BOCKFORD, ILLINOIS

HORS AND MACHINES SINCE 191



Universal Drill Block

By B. C. BALLARD

DRILL bits have a tendency to wander when used at an angle or on a contoured surface. Inaccurate holes often result, and quality depends solely on the experience of the driller, who has no mechanical aids to steady the drill and set the angle. This problem was solved recently at Temco Aircraft Corporation. The solution was provided by a ball and socket-equipped drill block that is called "universal" by the Dallas, Texas, firm because it fits any surface contour and secures

Universal drill block incorporating ball-andsocket construction which permits drilling at an angle or on a contoured surface without any tendency of the drill bit to wander



the bit at any desired drilling angle.

The block measures 31/2 x61/2 inches, and the tool steel from which it is made is 114 inches thick. The block has a hole in its center for a slip-fit drill bushing that secures and guides the drill. The hole, bored for a 1-inch bushing, is centered in a ball which, in turn, is enclosed in a socket. The radius of both the ball and socket is 21/4 inches. Since each has the same radius. the ball would be immovable, if other provisions were not made. The ball is allowed freedom to rotate within the socket. This cut widens the socket enfrom one end to its juncture with the socket. This cut widens the socket enclosure fractionally, and the socket itself-made of two separate semi-circular pieces, held in the block by set screws-widens just enough to afford the enclosed ball sufficient clearance to move.

Thus, the ball, and the bushing hole within it, can be tilted to any reasonable degree for angle drilling. Once at the proper tilt, the ball can be secured in that position. This is done by tightening a cap lock screw which closes the cut in the block which, in turn, tightens the socket around the ball.

In cases where angles must be exact, to fractions of degree, the bushing hole angle may be preset by setting on Illustration showing use of universal drill block in drilling on a contoured surface

a sine plate. Thus, the balland-socket bushing makes angle drilling fast and easy work, even for inexperienced jig or toolmakers. Other provisions incorporated in the universal block make drilling on contoured surfaces just as easy.

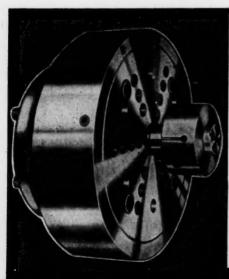
Socket - head jackscrews

are threaded into the drill block at five different points, including the four corners of the block. These screws can be run out of the base of the block so that they extend like legs. On an irregular surface, the screws' exposed lengths are adjusted so that they make the block a solid



platform; then the block is secured to the surface with a C-clamp.

Temco uses the universal block principally for enlarging holes; however, the device is equally well-suited for locating holes. It can be used with a hand-operated drill or with a drill press.



9 Reasons for You to get the Facts on SPEEDGRIP CHUCKS

- 1. They increase production.
- 2. They give greater accuracy.
- 3. Set-up time is shorter.
- 4. They are safer to operate.
- 5. First cost is low.
- 6. Maintenance cost is low.
- 7. Design is simple.
- 8. Guaranteed to do the job.
- 9. Service is prompt.

Speedgrip Precision Internal Chucks will save you money on second operation work.

WRITE FOR FREE MANUA



SPEEDGRIP CHUCK

820 N. WARD STREET





2300° F. IN 30 MINUTES

Turn the heat on production. Heat treat carbon and high speed steels, dies and tools in your own plant with JOHNSON No. 120 Hi-Speed. Fast heat-up saves time and gas. Temperatures easily regulated with accuracy. Firebox: 5 x 7½ x 13½. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

Also available in bench style. Write for Free Catalog.

Johnson Gas Appliance Co., 571 E Avenue N.W., Cedar Rapids, Iowa

JOHNSON

FURNACES FOR INDUSTRY

Spacer Tube Forming Die

By D. A. ROGERS

THE forming of a seamed tubing, either in punch press practice or with a power brake, is usually reduced

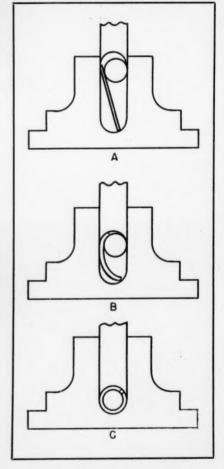


Fig. 1—Sketch showing use of unique forming die in producing spacer tube of the type shown in Fig. 2

to two operations. Figure 1 shows a unique type of die design that will

SANFORD SURFACE GRINDER MODEL MG

For Dry or Wet Grinding!
PRECISION . SPEED . SENSITIVITY

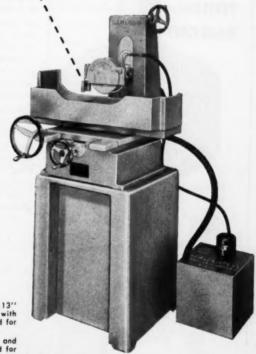
Built by manufacturers who concentrate on small grinders only, each Sanford Grinder is an individual project of time tested and proved basic design. Although modest in price, no quality undermining shortcuts are employed to reduce manufacturing costs. Constant repeat orders prove its acceptance.

This sensitive machine arinds to micro-inch accuracy with no vibration, with maximum dimensional stability. Here's why:

- Transverse ways are double Vee (VV) Meehanite inserts instead of flat surfaces which depend upon unstable jibs for alignment and accuracy.
- Needle, Ball and Oilite Anti-Friction bearings are used throughout.
- Alignments are electronically checked for accuracy.
- Precision slides are ground, lapped and hand spotted.
- Dials are large and legible.

SPECIFICATIONS - 83/4" transverse - 13" longitudinal-12" vertical under 7" wheel with Adapter. Approximate weight 630 lbs. Send for illustrated bulletin.

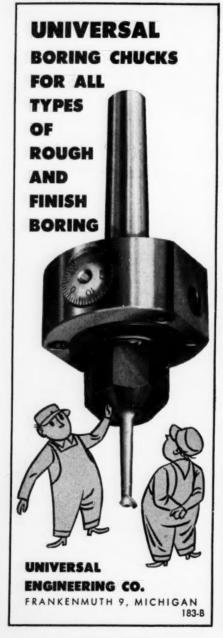
Replacement parts, special attachments and reconditioning facilities are available. Send for



*With optional equipment



1022 Commerce Ave., Union, N. J.



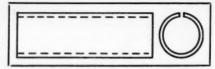


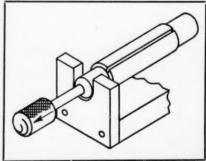
Fig. 2—Sketch of spacer tube produced with forming die of the design shown in Fig. 1

form tubing or spacers, such as shown in Fig. 2, up to practically any length of material from 1/64 to ½ inch thick in one operation. The unusual advantage of this type of die is that it will produce very accurate inside diameters, as well as outside diameters, and will maintain free position of the formed seamed tube after the mandrel has been removed from the finished formed tube, as indicated at C in Fig. 1.

Seamed tubes of practically any length can be so fabricated, and the mandrels can either be removed by hand, as shown in Fig. 3, or a double-action air cylinder can be introduced and mounted close to the press, as shown in Fig. 4. The required blanks can either by produced by the blanking process or sheared to the desired length and circumference requirements, as shown at A in Fig. 1.

In operation, the blank is merely placed in the die alongside of the man-

Fig. 3—Sketch showing manner in which formed spacer tube can be removed by hand from forming mandrel



DO YOUR MILLING MACHINES POSE SERIOUS '54 DOLLAR-QUESTIONS?

Are your milling machines OLDER THAN YOU THINK? Are they eosting you more than you can afford? Recent surveys indicate many thousands of millers over 10 years old . . . and some even younger . . . have been so badly overworked that they are much older than their age implies. In terms of production efficiency, it would pay to "retire" them. Precision-wise and cost-wise, many "good looking" machines are dangerously too old to compete in today's production economy. Are your milling machines wastrels? Are they squandering dollars? Are they an "iron curtain" between you and profitable sales in today's competition? Wouldn't you consider abler replacements, as a sensible investment, to increase your ability to produce at a profit?

• You'll find sound answers to these 1954 dollar-questions in our BULLETIN® on the new

IMPROVED TYPE "G" KEMPSMITH MILLING MACHINES

... free from cost-adding non-essentials ... fortified with practical performance advantages ... economical in first cost and maintenance ... RIGHT for toolroom, maintenance, job shop and general precision production operations.



A 7828-1PC

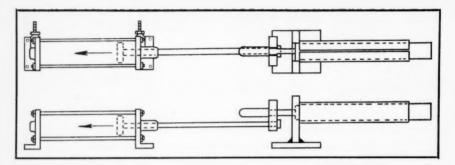


Fig. 4—Sketch showing how double-action air cylinder can be used in removing forming mandrel from completed spacer tube

drel, as shown at A in Fig. 1. As the punch descends, the forming operation takes place as shown at B in Fig. 1, and the finished spacer tube is completed as indicated at C. By increasing the circumference requirements, practical metal-to-metal finish can be obtained readily on the finished seamed tube.

Keyway Broaching Emergency Tips

By Louis O'SINGER

BROACHING pilots for horizontal broaching machines are not made on the spur of the moment. Although they are not too complicated, it takes



Juick Change Tools

FOR

- · BORING
- · MILLING
- . DRILLING
- · & TURRET
- · LATHE USE

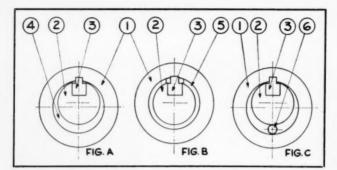


(PORTAGE DOUBLE-QUICK)

Changes from one tool to another is a matter of seconds. Three point locking feature and tapered shank assures repositioning and eliminates "run out." Send for catalog describing individual holders and adapters or for specific information on your machine tools.

RTAGE Double-Quick TOOL CO.

1041 Sweitzer Avenue · Akron 11, Ohio



Sketch showing three methods that permit the use of smaller pilots for broaching a workpiece

some time to make them and, occasionally, the rush job or the emergency repairs just cannot wait.

The accompanying sketch shows three methods that permit the use of smaller pilots for broaching a workpiece (1). The method shown in Fig. A is the most efficient but not the simplest. A bushing (4) is made with the inside diameter to be a slip fit over

the undersized pilot (2), while the outside diameter of the bushing is a slip fit with the inside

diameter of the workpiece (1). This bushing is made eccentric so that the thinnest section is about 0.020 inch thick. The bushing is then split by removal of a section slightly wider than the keyway to be cut. This split, obviously, must be at the thinnest section of the bushing.

Figure B shows a method that is similar to the one described above,

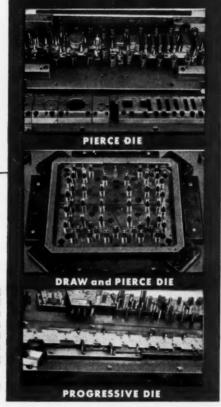


MHO USES R-B PUNCHES



Through many years of providing America's leading industries with interchangeable and standardized punches, die buttons and retainers, R-B has built a reputation for increasing production, lowering costs and saving time. R-B case histories of savings and benefits include users of cam actuated, multi-station progressive, forming, blanking, piercing, embossing and combination dies of all sizes and types.

Why don't you investigate the cost saving features of R-B equipment?



Use R-B Engineering Service for Your Tough Piercing Problems.

RICHARD BROTHERS PUNCH DIVISION ALLIED PRODUCTS CORPORATION Dept. 77 - 12625 Burt Rd. - Detreit 23, Michigan Please send me additional information. NAME COMPANY ADDRESS CITY ZONE STATE ALLIED PLANTS SPECIAL COLD FORGED PARTS STANDARD CAP SCREWS PRECISION GROUND PARTS SHEET METAL DIES MADE OF FERROUS ALLOYS, ZINC ALLOYS OR PLASTICS

except that the bushing (5) is concentric and therefore easier to make. However, note that the keyway being cut into the workpiece is not nearly deep enough to be a standard keyway. To cut deeper, it is necessary to raise the broaching cutter (3) with the help of a shim (not shown). Such a shim should have a hook in front to prevent it from being drawn through the workpiece during the course of the broaching process.

Figure C shows by far the simplest and fastest solution. No bushing is required as a length of drill rod (6) of proper diameter and length helps locate the work (1). The diameter of this rod (6) should be a few thousandths larger than the difference between pilot diameter (2) and the inside diameter of the work. Should the available rod be a few thousandths too small and therefore not hold the workpiece tightly, a second rod of the same

diameter can be inserted next to the other rod. This second rod will provide additional support for the work and aid by centering it at the same time.

Adaptor for Grinding End Mills

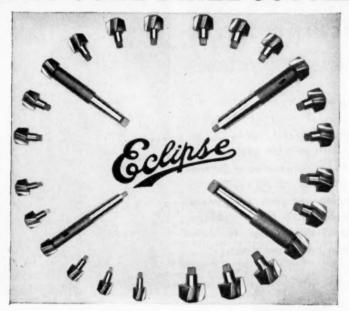
By J. M. GOODWIN

A N adaptor for a Cincinnati grinding ing machine which permits the machine to be used for vertical grinding is now saving \$4,000 a year for the Chance Vough Aircraft plant at Dallas, Texas. As shown in the accompanying illustration, the adaptor is designed to clamp to the main spindle housing of the machine and hold an air grinder in a vertical position, thus allowing the grinder to swivel in a di-



FALLS PRODUCTS, INC., 124 Genoa Street, GENOA, ILL., U.S.A.

Only 4 HOLDERS FOR 25 CORE DRILL CUTTERS!



Standard stock two-piece core drill cutters from 11/2" to 3" diameter.

For use in turret lathes or other applications where guide bushings are not required. Eliminates excessive overhang. Increases rigidity... Short body provides uniformity of length with other tools in turret... Maximum chip space because holder body diameter is same or less than root diameter of core drill cutter.



New Model 40B Numbering and Lettering press

Mono Wheel — Automatic Spacer

Designed for impressing Letters and Numbers in all kinds of flat metal parts. Stamps plates up to 5" w. x 6" l. Carriage table advances one space with each impression of the dial, like a typewriter, doing rapid work even spacing and perfect alignment. Different size dials are interchangeable. Direct sight gauge facilitates stamping in the proper space.



New Model 40B

Write for Bulletin MS40B

NUMBERALL STAMP & TOOL CO.

rection parallel with the main spindle. In this manner, tapered helical cutters can be refluted with little difficulty, and new cutters can also be quickly and easily made.

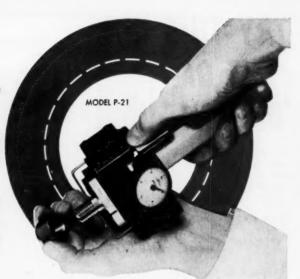
The air grinder comprises a ¼ h.p. air motor equipped with a small abra-



An air-powered grinder adapter clamped to a Cincinnati grinding machine enables vertical cuts to be made. Thus, tapered helical cutters can be refluted repeatedly, saving \$4,000 annually for Chance Vought Aircraft.

sive wheel that makes accurate cuts on the helix and rake angles of the spiral tapered end mills, thus prolonging the lives of these mills by assuring a true cut. The mills can be resharpened up to eight times using this equipment. It is estimated that the particular grinding equipment. It is estimated that the air grinder adaptor would cost approximately \$100 to make.

BRYANT GAGE FOR INTERNAL THREADS



The P-21 is a portable comparator gage. Variation from basic size of pitch diameter, form and lead are shown in a single reading on the dial indicator accurate to .0005". Interchangeable pairs of segments inspect all classes of threads in a range from 5./16" to 5" diameter.

The gage segments work on the principle of an expanding master plug. A thumb lever collapses one segment so that the part can be loaded. When the lever is released the segments engage the thread. The movement of one segment registers on a precision dial indicator which shows the accumulated amount of variation from basic size. The segments are made to the same tolerances in P. D., form and lead as a class "W" moster. The segments are attached by four screws. Periodically the segments are checked to a master ring gage and the "O" setting of the indicator is adjusted accordingly. Worn segments may be returned to the factory to be reground. Dirt or cutting oil cannot affect the working parts of the gage as there are no slides or pivots. The indicator may be turned on the axis of the stem to keep the dial visible. This gage weighs only 16 oz. without the segments.

This gage is designed for use at the inspection bench or in the shop. It is used for quality control since complete control of the thread cutting process is possible. The indicator reading of variation from basic size tells exactly where within limits the work is running. For this reason also, the gage is used for checking tool wear in production jobs.

STREET

Please send descriptive literature covering the P-21 gage and other Bryant gages.

A bench type gage for external or internal threads is available, with or without squareness-of-face attachment.



BRYANT

CHUCKING GRINDER CO. Springfield, Vermont, U. S. A.

MAIL THE COUPON TODAY!

BRYANT CHUCKING GRINDER CO., SPRINGFIELD, VT.

Please send me illustrated folders giving full information on the Bryant Portable and Bench Thread Gages.

NAME_____TITLE____

COMPANY

CTATE CTATE

. .

TRY THIS BIT OF BALANCE

MEAR RESISTANCE TOUGHNESS RED HARDNESS

Here is a Bit that has the toughness, the wear resistance and the heat resistance— all three!
One quality isn't built up at the expense of another.
That is why du



MONT Bits will do most for you — more cuts per bit and per dollar — a keener cutting edge — longer life.

Prove to yourself in actual performance that the du MONT Bit is your best bet. Ask us to mail you FREE Comparison Chart, Size and Price List S-1 and the name of the nearest Distributor.



The du MONT Corporation Greenfield, Massachusens

Important Meeting Dates

May 2-4

Spring meeting of the National Tool and Die Manufacturers Association, Statler Hotel, Washington, D. C. Association headquarters: 907 Public Square Bldg., Cleveland, Ohio.

May 4-7

National Spring Meeting of the American Welding Society, Hotel Statler, Buffalo, New York.

May 5-7

American Society of Training Directors, 10th Annual Conference, Schroeder Hotel, Milwaukee.

May 5-8

Welding and Allied Industry Exposition, Buffalo Memorial Auditorium, Buffalo, New York.

May 17-19

American Supply & Machinery Manufacturers Association, Annual Convention, Waldorf - Astoria Hotel, New York. Association headquarters: 814 Clark Bldg., Pittsburgh 22, Pa.

May 17-20

Basic Materials Conference and Exposition, International Amphitheatre, Chicago, Illinois.

June 6-9

American Gear Manufacturers Association, Annual Meeting, The Homestead, Hot Springs, Virginia. Association headquarters: One Thomas Circle, Washington 5, D. C.

June 9-11

American Society for Quality Control, Eighth Annual Convention, Jefferson Hotel, St. Louis, Missouri. Society headquarters: Room 5036, 70 East 45th Street, New York 17, N. Y.

June 11

Cutting Tool Manufacturers Association, Summer Meeting. Association headquarters: 416 Penobscot Building, Detroit, Michigan.

June 20-23

National Metal Trades Association, 9th Annual Plant Management Conference, French Lick, Indiana. Association headquarters: Chicago, Illinois. It's New! Tested! Proven!

TRANSPARENT PACKAGES!

... For Immediate
Visible Identification!

Here's what Hy-Pro's
exclusive reinforced plastic
packages mean to you:

THE TAP SPECIALISTS DO IT AGAIN!

True to their reputation as *The Tap Specialists*, Hy-Pro has pioneered in the development of these revolutionary transparent tap packages.

They have been designed to save you money in inventory counts, size and thread checks, storage space, shipping and handling . . . at no extra cost to you.

Call for yours today. Hy-Pro offers a full line of top quality taps produced by engineer specialists.

- Immediate visible identification
- Faster Inventory
- Instant Size & Thread Checks
- Less Storage Space Needed
- Greater Strength, No Warping

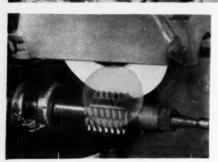
... At no extra cost to you!



HY-PRO TOOL CO., NEW BEDFORD, MASS., U. S. A.

New G Bond s





"Better cut and less burn than previous Norton or other make wheels. We're reordering 250 G Bond wheels," was the comment from this Ohio tool company.

"Now with a G Bond wheel we can go completely around a 16-inch face mill," writes the tool supervisor of a New Jersey plant. "Previously, due to wheel wear we had to index this type of cutter at four different positions. Now, on a finish cut we can go completely around, and the cutter runs absolutely true within .0005 inches. These new G Bond wheels have very good, cool cutting action, don't, break down or leave jagged edges . . . We'll be using plenty of them on our tool room jobs."



Lengthen wheel life up to 50%. Norbide dressing sticks, of hardest man-made material, last for years, keep your G Bond and other tool wheels in top condition.

ets new records in tool room grinding!

Here's Proof . . . Users praise the many

"TOUCH of GOLD"

advantages in Norton pace-setting wheels

Norton G Bond wheels have sure started something! In tool and cutter grinding, as in many other forms of precision and semiprecision grinding, they're giving users an entirely new slant on how efficient, longlasting and profitable wheels can be.

What users say about New G Bond Wheels

"Good finish, longer wheel life."

"Heavier feeds without burn."

"Run absolutely true."

"No breakdown — no jagged edges."

"Cut freely, hold shape with no burning."

"They show how a real wheel will cut."

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

G Bond Alundum* Wheels In Your Own Tool Room

will take heavier cuts in expensive, heatsensitive steels without drawing temper. They'll reduce tool spoilage, give you closer tolerances and smoother finishes than you ever got before — with fewer wheel changes and machine adjustments... Those are the value-adding, money-saving "Touch of Gold" advantages that make G Bond wheels outperform any others you ever used.

Your Norton Distributor

can recommend the right G Bond wheels for your jobs. Contact him or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified 'phone directory. Export: Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1531



Making better products... to make other products better



hamper a fast-moving production line.

For screws that fit your needs in every way . . . quality, sizes, specifications and service . . . you can do better with B-Right-On Socket Screw Products. Best materials, most modern production methods, careful inspection and a tradition of service to users through selected mill supply houses

assure your complete satisfaction.

We'll submit descriptive literature or samples for your most critical examination. No obligation, of course; just specify types and sizes.

THE BRIGHTON SCREW & MANUFACTURING CO.

Reading Rd. at Dorchester Cincinnati 2, Ohio



Machine Shop

ADVERTISING REPRESENTATIVES

Granville M. Fillmore, Vice President 342 Madison Ave., New York 17, N. Y. Murray Hill 7-7390

Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine

Duncan W. Barton

342 Madison Ave., New York 17, N. Y. Murray Hill 7-7390

Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D.C., Long Island, Brooklyn

George E. !lay

431 Main Street, Cincinnati 2, Ohio MAin 0182

Western Pennsylvania, Western New York State, Ohio, Kentucky, Southern Indiana

John M. Krings, Vice President

Tribune Tower, Chicago 11, Illinois DElaware 7-5441

Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, North Dakota, South Dakota, Northern Indiana

Richard S. Kline, General Manager 431 Main Street, Cincinnati 2, Ohio MAin 0182

MAin 0182 Eastern Michigan

Norman S. Rogers

431 Main Street, Cincinnati 2, Ohio MAin 0182 Central Indiana

Gene J. Schwarber, Advertising Manager

431 Main Street, Cincinnati 2, Ohio MAin 0182 Missouri, Kansas

The Robert W. Walker Company

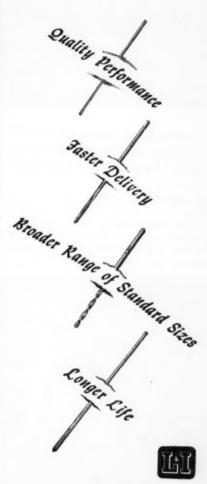
2330 West Third St., Los Angeles 5, Calif.
DUnkirk 7-4388
57 Post Street, San Francisco 4, Calif.
SUtter 1-5568

California, Oregon, Washington

MODERN MACHINE SHOP 431 MAIN ST. CINCINNATI 2, OHIO



Reamers give you more



The Reamer Specialists

LAVALLEE & IDE, INC. CHICOPEE, MASS.

modern equipment at work

Lo-swing Automatic Work Loading and Transfer Equipment Applied to Camshaft Job

TLLUSTRATION Fig. 1 shows an installation for producing camshafts of the type shown in Fig. 3. The setup consists of two standard 5 x 34-inch Model LR Automatic Lo-swing Lathes, each complete with necessary

tooling; automatic gaging station; work transfer and work loading equipment; and conveyor lines and control panel for coordinating the movements of the loading and transfer equipment. The machines are sufficiently spaced to permit easy access to the second machine for tool changing and also to allow for a bank of 20 camshafts to be accumulated on the conveyor line between the two machines. This build-

up or bank of work is important as only one machine is shut down at a time for tool replacement.

Figure 2 diagrams the flow of c a m s h a f t s through the conveyor, automatic handling equipment, machines,

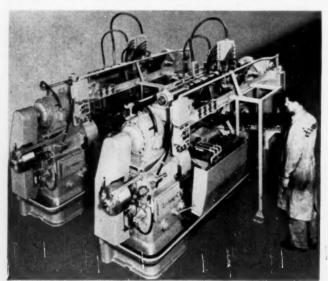


Fig. 1—This illustration shows a camshaft - producing installation developed by The Seneca Falls Machine Co., Seneca Falls, N.Y., for handling camshafts of the type shown in Fig. 3.

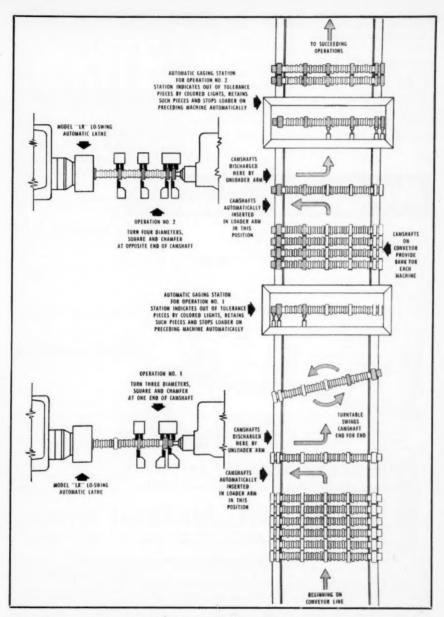


Fig. 2—Diagram showing the flow of camshaft through the conveyors, automatic handling equipment, machines, turntable, and gaging stations.

turntable, and gaging stations. The rough work enters this system at the left and is processed through two machines and two gaging stations automatically. Cycle time on individual machines may vary without affecting smooth operation of the installation. Safety and quality control devices instantly detect and signal off-tolerance pieces. The diameters machined in each of the two operations are indi-



Fig. 3—Type of camshaft produced with the equipment shown in Fig. 1.

cated by shaded areas on the camshafts.

The tooling is designed for rapid replacement. The front turning tools are fitted with adjusting screws which are pre-set in the toolroom after

the tools are ground. No tool setting is required at the machine. The rear facing and chamfering tools are mounted in magazine type tool blocks which are quickly replaced by other magazine blocks having pre-set tools requiring no tool setting at the machine.

The gaging instruments used in the automatic gaging stations are described as electrically operated, trouble-free, accurate and foolproof. The instruments indicate by means of dimensional lights whether the points of inspection are oversize. undersize, or within the tolerance by means of a green light, red light, and a blackout of the lights respectively. When all di-

New Big Barrel Micrometers have 7 BIG Features

- 1 Easy-to-reach Ratchet Cap. A Lufkin Exclusive! With the ratchet right in the cap you can still take "one-hand" measurements. Ratchet is completely enclosed protecting it from dirt and grit.
- 2 Big, Sensitive Direct-Feel Thimble.
- 3. Perfect Balance in Shorter Length.
- 4. Non-Glare Satin-Chrome Finish easier reading in either bright or poor light.
- 5. Easy-to-Read Markings Widely Spaced on Big Barrels. Circumference of the new barrel has been increased nearly 20% wider spacings between graduations make it easier to estimate tenths of thousandths.
- Rapid Reading Big Numbers Mark , Every Thousandth. Graduation lines are longer and clearer.
- 7. Slip-proof Black Crackle Finish on Frame. A Lufkin Exclusive. This durable and attractive finish makes the micrometer easiest to handle, especially when hands are oily.



Designed by <u>JUFKIN</u> for Faster, Easier, More Accurate Measurements

This new micrometer is designed to make it the best balanced, easiest and most accurate to use. Lufkin micrometers are the easiest to adjust too — the reading line always keeps its original position directly in line of vision, and the thimble doesn't cover measurements on the hub. Hardened and ground one piece spindle. Micro-lapped anvil and spindle faces. Tapered frame for use in restricted space. Available with carbide-tipped anvil and spindle faces.

BUY JUFKIN TAPES · RULES · PRECISION TOOLS FROM YOUR DISTRIBUTOR

THE LUFKIN RULE COMPANY, SAGINAW, MICHIGAN 132-138 Lafayette Stroet, New York City * Barrie, Ontario

307



decimalequivalent wall chart

.0154 .0312 .0469 0625 .0781 5625 .0937 .5781-37/64 1094 .5937 1250 6094-39/64 .1406 6250 .1562 6406-.1719 .6562 1875 .6719 .2031-13/64 43/64 .6875 .2187 .7031-45/64 -2344 23/32 2500 7344 .2656 17/64 47/64 7500 .2812 .7656 .2969-19/64 25/32-.7812 .3125 7969 .3281 51/64 8125 .3437 .3594 23/64 8281 27/32 -.8437 53/64 .3750 .8594 .3906-25/64 33/64 8750 4062 8906 4219-27/64 -57/64 .9062 4375 .9219 4531-29/64 9375 .9531 .9687 .9844-63/64 1.0000

In such popular demand

(we've given away 50,000)—we've made it better. The new chart is far easier to read! In three colors to automatically signal decimal-equivalents of fractions. The special products which frame the chart are a constant reminder of a good source of coldheaded parts.

JOHN HASSALL, INC.

P.O. Box 2177 • Westbury, Long Island, New York





A \$5,000 or \$10,000 purchase is carefully considered . . . but, too often small periodic purchases — like metal cutting saw blades — are not recognized as adding up to a sizeable annual total . . . and you can't afford "second best" blades.

To cut metal faster, straighter and longer... no better blades are made anywhere at any price than MILFORD. STOP... THINK... Then compare MILFORD'S low cost-per-cut and learn why there is no sounder investment in metal cutting.

BUY MILFORD BLADES THROUGH YOUR LOCAL MILFORD DISTRIBUTOR

Profile Blades and Band Saw Blades, Hand and Power Hack Saw Blades

4===	
* T	HE HENRY G. THOMPSON & SON CO.
I Sa	w Blade Specialists for Over 75 Years
N	EW HAVEN 5, CONNECTICUT
	Please send a copy of the new MILFORD Metal Cutting Catalog.
	I would welcome a MILFORD demon- stration in my plant.
N	AME.
PC	OSITION
CC	OMPANY
CC	O. ADDRESS
	TV 70115 55155

ameters inspected are within the specified tolerance, the workpiece is automatically released from the gaging station and deposited on the conveyor rails. If the part is oversize or undersize, the workpiece remains in the gaging station and the machine, having produced the off-tolerance piece, stops automatically at the end of the machine cycle. The toolsetter then changes the cutting tool, which is signaled as faulty by the dimensional light in the gage, and releases the offtolerance piece from the gaging station by means of a conveniently located push button. The master control switch button is then operated and the machine again operates on an automatic cycle.

The first machine in the installation is equipped with a three-dimension gaging assembly while the second machine has a four-dimension gaging assembly. One particular advantage of automatic gaging is that each part is inspected immediately on leaving the machine, thereby assuring that all parts on the conveyor line are within specified tolerances, thus reducing scrap and salvage operations.

Precision Tapmaker Employs Unit Dust Collectors for Grinders

EXTREMELY intermittent use of grinders, with the savings in installation time and subsequent operating power has prompted the selection of unit type dust collectors to collect dust from seven Cincinnati grinders in the shop of a leading producer of precision custom - made taps. The amount of air required right at the source of dust totaled approximately 3,000 c.f.m. Since the plant is located in the far northern zone where low temperatures prevail over a long period of the year, it was mandatory



6 Features for Tool Room

and Production Testing

● This Model 3-JR WILSON "ROCK-WELL" Hardness Tester is proving invaluable for tool room use and most production testing. It will pay for itself many times over by eliminating costly complaints from your customers.

These features make for accuracy and long life—

(1) Totally enclosed dirt and dust-proof "Zerominder" dial gauge. (2) Gripsel clamp screw for quick change and proper seating of penetrator. (3) All controls conveniently grouped. (4) Enclosed, easy-to-reach, variable speed dash pot. (5) Stainless steel elevating screw. (6) Standardized weights.

No matter what your hardness testing requirements, there is a WILSON "ROCKWELL" Tester to meet it. They are in two types—Regular and Superficial. They are in many styles with accessories for testing flats, rods, rounds and odd shapes. Ask about the WILSON TUKON for micro-indentation testing. Write us for complete information and recommendations.

*Trade Mark Registered



Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N. Y.



View of shop of precision custom-made tap producer, showing how individual dust collectors are used to collect the dust from seven universal grinders

that the clean air be returned to the interior of the shop rather than wasted to the out-of-doors.

The unit type collectors selected are Model 520 Dustkops manufactured by Aget-Detroit Company and rated at about 500 c.f.m. respectively. Each collector is entirely self-contained in that it has its one cyclone separator and second stage filter to permit return of the cleaned air to the shop. Each collector is placed behind its respective grinder, and a short section of connecting hose (with hood) is fastened to the inlet of the collector.

Maintenance of the collectors is effected by each grinder operator giving his collector a "morning shakedown" before starting the grinder. The collectors are installed on stands to facilitate removal of the collected dust from each unit.

By having an individual dust collector for each grinder, the grinders can be operated intermittently with electrical power consumption held to a minimum since the only dust collectors "on" would be those connected to machines in actual operation. Each collector has a 1/3 h.p. motor.



Severance regrinding service

RECONDITIONING TO New Tool PERFORMANCE AT A FRACTION OF New Tool COST

HIGH SPEED

We Regrind MIDGET MILLS . ROTARY FILES
BURRS . COUNTERSINKS . COUNTERBORES
FIND MILLS . MILLING CLITTERS . DEAMERS

CARBIDE

AMERICAN MAJOR INDUSTRIES FINDS IT

PASS American Major In-

dustries are now sending their dull cutters to Severance for regrinding because they know (1) strategic material is being conserved (2) quick deliveries are assured (3) their reconditioned tools will give new-tool performance, and (4) their production costs are lowered. This SEVERANCE SERVICE is paying-out for

At SEVERANCE, New-Tool Craftsmen, using the same precise skill and care that they do in grinding new tools, regrind your cutters. Send in your dull cutters today!

others — It will Pay you too!

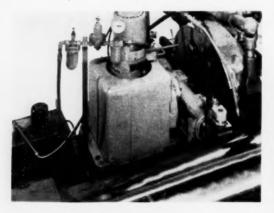
SEND YOUR DULL CUTTERS TO

Severance TOOL INDUSTRIES INC

724 Iowa Avenue, Saginaw, Mich. In Canada: 60 Front St. W., Toronto

CATALOG INCLUDING REGRIND PRICES SENT ON REQUEST





Superfinishing Increases Operating Efficiency and Life of Radial Drill

CONSTANT refinement of product is one of the basic principles of operation of machine tool builders.

Vertical column for Fosdick radial drill is shown being Superfinished using Gisholt equipment.

When the Fosdick Machine Tool Company of Cincinnati wanted to improve the performance of its radial drills, the company specified a Superfinishing operation on the vertical columns and has found the process very satisfactory. The vertical column now has a much longer life, and power elevation of the

heavy drill arm is easier and smoother, because chances of binding are said to be eliminated. The Superfinished surface is 12 inches in diameter and approximately 38 inches long.

During manufacture, the column is rough ground to 25-30 microinches. It



LIBERT MACHINE CO.

for BETTER PRODUCTION and MAINTENANCE at lower cost

A proved time-saver in any sized shop. Libert's flexibility gives you a wider variety of work—clean shearing of flat or formed sheet metal... straight or irregular shapes...inside or outside cuts. Libert simplicity means that even unskilled labor soon does accurate work, lots of it and fast!

Write for bulletin.

Made In sizes up to 60 in. throat, 10 gauge capacity

Libert Hi-Speed SHEAR



A Fray pays bigger production dividends by performing an unequalled range of milling operations. Both of the top slides on the Fray 10 RH are easily adjustable. This feature permits alignment of the turret slide with the table, thus doubling longitudinal and cross milling range . . . or you can just as simply set the turret at an angle to the table and mill in two directions. Combined, the turret slide and table slide provide 38" of overall travel, while the table cross slide, plus the ram slide permits a full 18" of in-and-out adjustment. This equals the overall range of much larger machines, Fray moves precision work faster at less cost.

Fray "All-Angle" Head TYPE 4

For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.

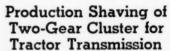


Write for details and specifications Request Bulletin #10

Overall Height 7 Feet



is then Superfinished to 1-2 microinches with an attachment mounted on the grinder bed. This arrangement not only saves finish grinding but also eliminates additional handling. Superfinishing attachments and machines are manufactured by the Gisholt Machine Company located in Madison, Wisconsin.

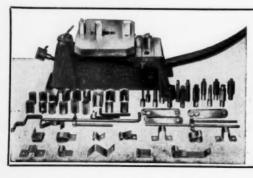


PRODUCTION shaving of a twogear cluster for farm tractor transmissions poses a machine requirement of high production and flexibility. The same machine is used to finish both gears in the cluster and it must be capable of performing the shaving operation to the required accuracy with a minimum time loss for changeover.

To attain a production rate of about 240 gears per hour, a Model 870 underpass gear finisher built by Michigan Tool Co., Detroit, Mich., is automation equipped. The only operator attention required is putting parts into the loader. An automatic sizing fixture at the entry end of the loader prevents the loading of oversize parts, so that only gears that are within size limits for shaving pass through. This arrangement results in fast shaving and accurate gears, as well as maximum cutter life.

Since one of the gears in the cluster has 23 teeth with a 14 normal pitch and a 1.6429-inch pitch diamet-





Madiform

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies , Etc.

AIR OR HAND MODELS FOR UP TO

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.



GRIPPING FORCE 15 TIMES AIR LINE PRESSURE

Speedy Air Vise helps you do dozens of operations faster, better, cheaper—by air pressure! Foot control valve opens and shuts vise instantly, leaving both hands free to produce more! Jaw opens up to 3 inches, holds castings, parts, jigs, etc. Compact, trouble-free, inexpensive.

Complete with Foot Control Valve, Air Hose and Fittings...only \$36.00

ORDER FROM YOUR MILL SUPPLY DEALER OR WRITE DIRECT



W. R. BROWN CORP. • 2649 N. NORMANDY AVE. • CHICAGO 39, ILL.



MILLING CLAMPS

MACHINE CLAMPS

Drop forged hold-down clamps quickly adjust from 1" to 6", by 16ths, take \$5" T-Bolts. Set of 12 pieces (2 plain, 2 gooseneck crosspieces; 2 each 2, 3, 4 and 6" uprights) \$19.50.

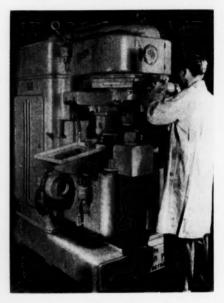
Check for Circular Check for 10 Day Free Trial THEN MAIL AD TO

MONIGOMERY TOOLS

Dealers Invited

24 Austin St., Newark 5, N. J. Bigelow 8-1045

er, and the second gear has 28 teeth with a 14 normal pitch and a 2-inch pitch diameter, the machine setup is changed for each shaving operation. Only three steps are required in the change-over, and these steps are accomplished in a few minutes as follows: (1) Center distance is changed by means of a handwheel; (2) sizing fixture is changed by removing four



Operator is shown using sizing fixture at top of loader. Gear is automatically sized without delay. Second sizing fixture is visible on housing to left of operator.

bolts; and (3) the sub-plate, mounting the head and tailstocks and the loader, is positioned by lining up locating markers (visible at front of machine).

A cylinder pushes the gear to be shaved into a round carrier with a diameter equal to that of the larger gear. When a limit switch is tripped on retraction of the cylinder, a second cylinder at the rear of the machine pulls the gear into shaving position.



Sibley E-25

Not too light, not too heavyweighing 765 lbs., this 25" swing drilling machine has the required speed and power for high volume production. Accuracy of large table with coolant trough is maintained to .0007" in six inch radius. The variable speed drive permits selection of the exact speed for any size drill from 1/8" to 1". Convenient speed control is self-locking with no belts to change. Tachometer permits accurate reading of speeds. Powered with a 1-1/2 H.P. Axial Air Gap Motor. 5 spindle speed





SIE	LE	Y M	CH	NE &	FOUN	DRY	CORP.
35	E.	Tutt	St.,	South	Bend	23,	Indiana
-	10						

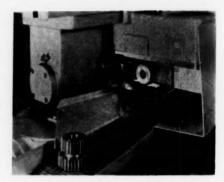
Name Title Company

Address

options.

An arbor moves into position and holds the gear for the shaving operation. Movement of the arbor into position causes a limit switch to be tripped, starting the underpass shaving cycle.

When the cutter stops at the end of the shaving cycle, another limit switch is tripped, causing the arbor to retract and the gear carrier to return to loading position. The next gear being moved into shaving position pushes the finished gear onto a chain



Close-up view showing gear being brought into position for shaving. In left foreground is the conveyor used to take finished gear away

from machine.

conveyor which carries it to a stock tray or to another conveyor, as desired. During the shaving operation. 0.005 inch of stock (measured over two pins) is removed. The 23-tooth gear is shaved at a rate of 240 per hour with output of the 28-tooth gear being slightly lower.

COMBINATION ROTARY TABLE

THE TWO IN ONE

AND ANGLE PLATE

PRECISION ACCURACY

VORM adjustable from 0 to 90 degrees.

> VERNIER control to within

WRITE FOR FOLDER

2 seconds of Arc.

Makers of Helical Gear Speed Reducers. Worm and Gear Speed Reducers. Standard and Special Gears. Wedge-Lock Turret for Lathes and Turret Lathes.

Open territory available to representatives

OLSON INDUSTRIAL PRODUCTS, INC. 40 W. WATER ST. WAKEFIELD, MASS

Tungsten Carbide Insert Tool Provides 47 Miles of Lineal Cutting Per Grind

GREATLY extended tool life was recently obtained at the Capitol Machine Co., Columbus, Ohio, a modern contract machine shop, by the use of clamped tungsten carbide tooling

BURR Midget Portable KEYSEATERS

Hand, Drill or Motor drive to handle shafts up to 21/2" for cutting Woodruff and Straight keyways. Light weight for field work. Other series up to 12" shaft capacity.

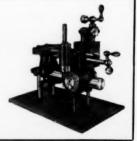
Write for details.

JOHN T. BURR & SON, INC.

429 KENT AVENUE

236

BROOKLYN 11, NEW YORK



Simplify Repetitive Operations

SOUTH BEND TURRETS

Repetitive operations requiring close tolerances can be efficiently done with these quality-built, accurate lathe turrets. There are 165 other attachments, tools and accessories for South Bend Lathes that will help you do better tooling at lower cost. Write for Attachment Bulletin 5321.



HANDLEVER BED TURRET

Mounts any place on bed. Indexes automatically ± .0005" at 4" from turret face. Hardened, ground and superfinished index pin. Automatic feed stop for each position. Effective slide feed 4". Tool holes \(^3\kappa''\) or \(^3\kappa''\). Two adjustable gibs on turret slide.

Size Lathe	Catalog No.	Price
9"	CL1611N	\$273.
Light Ten	CL1611K	280.
10"	CL1611R	286.
13"	CL1611T	308.
		AH

All prices f.o.b. factory



HAND FEED TURNSTILE BED TURRET

For 16" swing lathes.

Indexes ±.0005" at 4". Superfinished index pin, Automatic indexing and feed stops. Slide feed 5½".

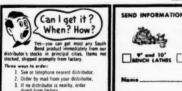
Takes turret tools with 1½" diameter shank. Price \$683.



SQUARE TURRET TOOL BLOCK

for Compound Cross Slide Mounts 4 cutting tools. Turret indexes within .0005" to 4 positions. Quick acting lever lock. Rocker adjustments for tool height.

Size Lathe	Catalog No.	Price
9" & 900	CL3375N	\$46.00
Light Ten	CL3375K	48.50
10" & 1000	CL3375R	52.00
13"	CL3375T	58.50
141/2"	CL3375F	84.00
16" & 16-24"	CL3375H	91.00



SEND INFORMAT	TION CHECKED:				
		3	190		
BENCH LATHES	FLOOR LATHES	PRESSES	GRINDERS	TURRET LATHES	BENCH SHAPER
Nume					
Street			City & State		
					BEND

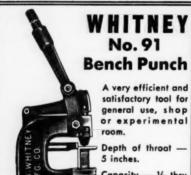


AVOID RUN-OUT! Lubricant sealed-in and flushes outward, keeping center free from borings and chips. Easily mounted on work bench or machine. For greater production . . . greater safety . . . use an "H. K. Lube Dispenser."

PRICE - - - \$18.50

H. K. LUBE DISPENSER

H. K. TOOL CO., WAUKESHA, WIS.



Capacity - 1/2 thru 1/4 or 2 thru 1/8".

Notches angles 1 1/2 x 11/2 x 1/8.

Punches supplied in rounds, squares, ovals, rectangles or specials. Especially adaptable for experimental work. Also made in 10". 18" and 24" depth of throat.

Write for catalogue.

W. A. Whitney Mfg. Co.

640 Race St.

Rockford, III.

for boring alloy iron (Brinell 210-230) truck brake drums. Machining the 16.420-inch bore to a 7-inch depth on a Potter and Johnston turret lathe proved too difficult an operation for the tools first tried on this job. Because of excessive heat developed during the cut-which varies from 1/4 to 1/4-inch depth due to runout of the castingonly about 5 pieces could be bored per grind.

Now, with a Style SBL-16A Kenna-



Boring 16.420-inch inside diameter of alloy iron truck brake drum with Kennamatic square insert tool at 240 s.f.m., 0.024-inch feed, and 1/8 to 1/4-inch depth of cut

matic tungsten-carbide verticallyclamped square insert tool of Grade K6, 20 to 25 drums are readily bored per indexable cutting edge. This represents about 6 miles of lineal cutting. Both the back and side rake angles of the insert were changed to zero by grinding across its corners with the holder in a grinder vise. The operation is performed at 0.024-inch feed per revolution and 240 s.f.p.m.

Since four new edges are available on each end of the insert, 160 to 200 pieces are bored per grind. Approxi-



It is as simple as this: The Continental Standard Drive consists of integral double driving lugs on the shank of the cutter which engage double abutments in the socket of the holder. Double aligning bearings keep the cutter and holder in rigid alignment. The drive is machined from the solid—there are no pins or loose details. Result—a balanced, positive drive which is non-wedging and practically indestructible.

Order through your Ex-Cell-O representative or direct from the Continental Tool Works in Detroit.

Continental Counterbores may be purchased individually or in sets. Write on your company letterhead for Catalog 60681.



Here it is ...



THE NEW SUPERIOR MAGNETIC BASE AND INDICATOR HOLDER

A combination tool—powerful, permanent type Alnico magnetic base and a 3-piece Universal Indicator Holder. Holder can be detached and used in any chuck. Fits practically all test or dial indicators.

The Superior Indicator as shown is a dial type test indicator. Has two contacts— $1/32^{\prime\prime}$ threaded within $1/8^{\prime\prime}$. Double-faced, reads front and back. Two crystals.

Indicator including tool post holder and 1/32" and 1/8" Contacts (Less Universal Holder) — Black Pentrate, \$6.95; Satin Chrome, \$7.95

SUPERIOR INDICATOR COMPANY

P. O. Box 734

Rochester 3, N. Y.



mately 20 regrinds are available per tool for a total of 3,200 to 4,000 drums per insert life.

Fast Setup for Drilling Automobile Door Handles

INCORPORATING four automatic drilling units, the machine illustrated herewith, product of the Govro-



This machine is set up to tap-drill automobile door handles at the rate of 600 parts (1,200 holes) per hour.

Nelson Company, Detroit, is set up to tap-drill two ¼-20 holes in two automobile door handles in one operation at the rate of approximately 600 parts (1,200 holes) per hour. In using the equipment, the operator loads one right-hand and one left-hand part in the machine and then depresses the start-cycle button with both hands, whereupon the work is automatically clamped, drilled, unclamped, and ejected.

1806 W. BELLE PLAINE AVE.

CHICAGO . 13 . ILLINOIS



Specially selected sizes for the small shop or a standby set where additional blocks are a needed convenience.

Keep a second set with wanted sizes available on instant notice. Avoids delay or even error that might result from using substitute gaging methods.

The 43 Block Set (43 B) has accuracy of ...000008" and must pass the same test for surface finish, flatness and parallelism of the finest grade of steel blocks.

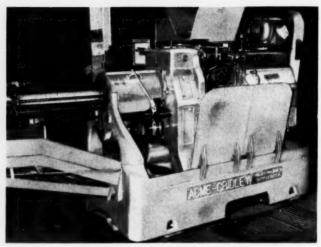
Webber GAGE BLOCKS

and ACCESSORIES

WEBBER GAGE COMPANY
12899 Triskett Road * Cleveland 11, Ohio

Largest exclusive manufacturer of precision gage blocks

Send inquiries direct to Webber Gage Company



This automatic screw machine in the plant of Republic Aviation is firmly mounted in place using "Unisorb" pads together with a special cement.

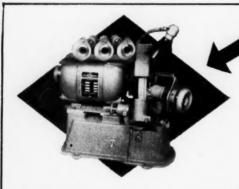
Machines Installed Without Using Bolts

REPUBLIC Aviation Corp., Farmingdale, Long Island, has installed many of its production machines

without drilling concrete floors or bolting machines in place. The Acme - Gridley 9/16-in. automatic screw machine in the accompanying illustration is securely mounted using

"Unisorb" pads, which reduce transmitted machine noise, as well as vibration.

A special cement is employed in conjunction with the pads at the base of each machine.



SHARPENS SMALL DRILLS ACCURATELY — WITHOUT SKILL

The Black Diamond Drill Grinder is the only drill grinder so fast and easy to operate. Used regularly by thousands! Enables anyone to grind small drills to absolute accuracy.

- Exclusive "positive positioning" assures precision grinding.
- · No skill required by operator.
- · Both lips ground in one operation.
- Web thinning made easy with special attachment.

Get all the details! Send for folder.



BLACK DIAMOND SAW & MACHINE WORKS, INC.

71 NORTH AVENUE, NATICK, MASS.

PHONE Olympic 3-4480



Carbon comes out of combustion chambers in a hurry with this NEW ½ Drill shown here equipped with wire brush. It's lightweight, compact, ideal for mechanics' tool kits. Ask for the NEW Sioux Model No. 14751



There's an answer for those hard to get at places in automotive, aircraft, and industrial work—it's the popular Sioux ½" all-angle Drill, designed especially for working in close quarters.

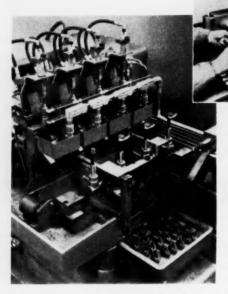


SIOUX
all the
way through!

Electric Drills, Sanders, Polishers, Bench Grinders, Portable Grinders, Valve Seat and Face Grinders, Electric Hand Saws, Flexible Shafts, Abrasive Discs.

ALBERTSON & CO., INC.

Two views of continuous cycle boring setup for rocker arm production. Rocker arms are malleable iron, Rockwell 16-23. Stock removal is 0.015 inch on the diameter. Boring heads operate at 1,750 r.p.m. with a boring lead of 0.004 inch. Net production at 75 per cent efficiency is over 600 pieces per hour.



Continuous Cycle Boring Setup for Rocker Arm Production

THE setup depicted herewith comprises a Model 221 Heald Bore-Matic equipped with four individual fix-

tures and loading mechanisms mounted on a fixture sub-base on the machine table. The fixture is designed to allow the operator to load four stations while boring operations are being performed on previously loaded parts, eliminating an increase in cycle time for the loading operation.

The cycle is as follows: The operator locates rocker arms on the four stake type loading arms and swings the arms up into the fixture. As the fixture clamp button is actuated, an air hammer arrangement seats the parts in the fixture prior to clamping. The operator then retracts the loading stakes from the fixture, contacting a microswitch which starts the table to the left. Following boring, the tools are automatically retracted, the table runs out at rapid traverse, and the work is automatically unclamped and ejected onto a conveyor.

Rocker arms are malleable iron. Rockwell 16-23. Stock removal is 0.015 inch on the diameter. Boring heads operate at 1,750 r.p.m. with a boring lead of 0.004 inch. Net production at 75 per cent efficiency is over 600 pieces per hour.

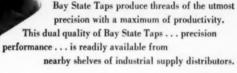


FULLER'S EARTH

Adds greatly to the safety of your shop • Provides safe non-slip footing • Absorbs oil and grease • Lessens fire hazard because, unlike saw dust or wood shavings, it is non-inflam-mable • Every shop needs this low cost safety aid.

A trial will convince you. Send for FREE SAMPLE.







BAY STATE TAPS

BAY STATE TAP & DIE COMPANY

MANSFIELD, MASS.

Adoption of Precoated Metal Coil Saves Cost of Paint Shop Expansion

WHEN Tom Thumb toy cash registers caught the public fancy, the sound of small fry happily banging up make-believe sales brought smiles of delight to the sales department at Western Stamping Co., Jackson, Mich., manufacturer of the device.



AND A complete line of COLLETS

• COLLIS Taper Tools are made by men skilled in this type of manufacture. Users get long satisfactory service from COLLIS Equipment and find the answer to all drilling, reaming, and tapping needs in the COLLIS line. We can give prompt service on orders for Lathe Centers, Arbors, Drill Drifts, and Magic Type Chucks as well as on Sleeves and Sockets and Collets.

THE COLLIS CO.

DEPT. A, CLINTON, IOWA



When Western Stamping Company began to fabricate toy cash register drawers and drawer dividers from Enamelstrip precoated metal coil, it was like money in the bank. The precoated coil eliminated the need to expand paint shop facilities and cut production costs by about 50 per cent. Parts blanked and formed from Enamelstrip are ready for final assembly without cleaning and finishing.

Not so happy were the men responsible for production. The cause of their concern was the paint department. As orders poured in, the capacity of this department proved inadequate to meet stepped-up production schedules for the toy cash registers and, at the same time, take care of other production in the plant.

At first, company officials believed that the only way to break the bottleneck was to expand facilities in the



Special Lengths and Types. Prompt Delivery.

Manufacturers Since 1903

HI-DUTY DRILL WORKS



Loosen a Set Screw and Look at the Shaft it's Pressing Against.

Has The Set Screw Made A Full Circle Impression?

To obtain the maximum resistance to rotation and sliding movement, a set screw must bear evenly on the shaft. Allenpoint Set Screws reproduce a full circle pattern against their mating surface for increased holding power. Even on shafts of small diameter you get a full circle impression with the smaller cup point of Allenpoint Set Screws.

Has The Point Left An Uneven Ridge Around The Indentation?

The holding power of a set screw will be greatly reduced if the bearing surface is rough and irregular. Serrated point set screws cut into the shaft, raising a chip, removing stock and weakening their grip. Allenpoint Set Screws press firmly into the shaft and form a smooth, deep indentation. The result is holding power that tops any other type point.

ORDERING THROUGH YOUR LOCAL INDUSTRIAL DISTRIBUTOR, SPECIFY ALLEHPOINT SET SCREWS

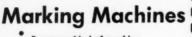


MANUFACTURING COMPANY Hartford 2, Connecticut, U.S.A.

paint department. This would have meant a costly investment in new ovens, other painting equipment and additional manpower. Before this step was taken, however, Western Stamping experimented with Enamelstrip coil in the fabrication of drawers and drawer dividers for the Tom Thumb cash registers. The material, supplied by Enamelstrip Corp., Allentown, Pa., is precoated with the desired finish so that no painting is requir-

ed after fabrication of parts.

The experiments proved an immediate success and Enamelstrip is now used for production of all the cash register drawers and drawer dividers. In order to use Enamelstrip, Western Stamping redesigned the drawer assembly to eliminate all welding. Now the drawers and drawer dividers are fabricated and assembled on a press line in four operations. The completely assembled drawers come off the press line ready to insert in the cash register. Western Stamping not only saved the cost of paint shop expansion but also cut production costs by about 50 per cent.



For every kind of marking Hand and power models Mark steel, other metal



and plastic products.

The ACROMARK SERIES 9A Machine shown at left will mark anything you make.

It's lowest in price and highest in quality. It comes in hand, motor and air driven models. Write for complete details.



Delpark Filter Designed into New Norton Grinder

Positive Company, one of the world's largest manufacturers of grinding machines, have incorporated into the base of one of their newest grinders the Delpark coolant filter. The machine, the Norton Type CM-1 Heavy Duty Semi-Automatic Multi-Wheel Grinder, utilizes several grinding wheels mounted between bearings for grinding different diameters simultaneously on the workpiece in a single plunge-grind operation. The high sludge load produced by these multiple grinding wheels is immediately removed from

THREADING TOOLS

FOR HOLES FROM 1/16" UPWARD
17 DIFFERENT SIZES

MADE OF SUPER-HIGH-SPEED STEEL SPECIALLY TREATED

(Available in Carbide)

- . CONSTANT SHAPE AND CLEARANCE
- . EASY RESHARPENING
- CONVENIENT TO USE LONG LIFE

Write For Complete Data

COMET Tool Co.



Dealers! Here's a Profit-Maker!

738-MM BROADWAY NEW YORK 3, N. Y.

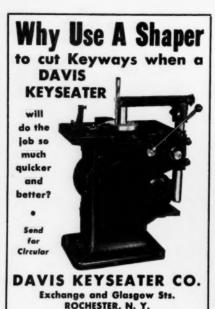


Spacemaker LANGERS

Streamlined design of the new T-J Spacemaker eliminates tie rods . . . saves up to 40 % in mounting space! It's performance-proved . . . super rugged with extra high safety factor . . . solid steel heads . . . heavy wall, precision honed, hard chrome plated, seamless steel body . . leakproof cylinder head to body construction . . . heavy duty, hi-tensile, hard chrome plated piston rod.

Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles ... for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 434. The Tomkins-Johnson Co., Jackson, Mich.



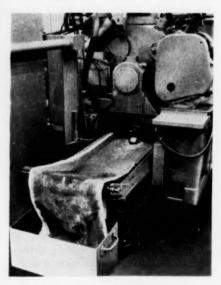




 Pioneers in the riveting field. Head rivets from smallest to 3½" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature and don't forget to send samples.

THE GRANT MFG. & MACHINE CO. 96 Silliman Ave. Bridgeport 5, Conn. the coolant supply, constantly keeping it clean and free of particles which would spoil the finish of the ground work.

The Delpark coolant filter used for this purpose is a continuous, selfcleaning gravity filter. Solids are filtered from liquids that flow, by gravity, through filter material, which discharges the solids, in a relatively dry state, into an outside container.



End view of Norton Type CM-1 Heavy Duty Semi-Automatic Multi-Wheel Grinder, showing the Delpark coolant filter incorporated therein

The filter material, fed from a roll, rests on, and conforms to, a flat endless conveyor of open construction. Sloping sides form a shallow pool of the conveyor and an inclined discharge ramp provides for removal of filtered solids. Dirt-laden liquid is fed onto the filter material, the liquids pass through, and the solids remain on the surface of the filter material. When the flow through the filter material is reduced by the solids held up-

® SUPER ®

Stark



Regular

Flute-Long Tip

Solid Carbide

Shell Type

Jobbers Type

RH & LI Spiral

Expansion Type







21650 Hoover Rd . Detroit 13 Michigan

5210 San Fernanda Rd., Los Angeles 3, California

on it, the liquid level rises. This action raises a float which actuates a switch, causing the conveyor to carry the filter material forward to discharge the accumulated solids and bring clean filtering material under the incoming dirty liquid. The float drops as the level of the liquid lowers, the conveyor stops until the need for clean filter material again causes the liquid level to rise, and the cycle is repeated.

Materials and Processes. Second Edition. By James F. Young. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1074 pages. Illustrated. Cloth binding, board covers. Price. \$8.50.

This book provides, in one volume, all the interrelated information needed to apply the engineering fundamentals of materials and processes to the design, production, and control of products. The volume treats topics from the viewpoint of the engineer and, as such, answers an important need in engineering education and

practice. The engineering viewpoint is rigorously applied to the important fields of metallic and non-metallic materials and manufacturing processes. Expanded by 50 per cent and brought completely up-to-date, this second edition includes a thorough coverage of the developments of the last 10 years, incorporating the recent advances in physical metallurgy and chemistry, useful material property data and process tolerances, the latest industry practices, and an inclusive summary of the topical literature.

Each chapter of the book is complete in itself. The volume may be used to cover a course of study or a specific topic. The great mass of illustrative data included in the second edition offers a unique check for the consideration of actual problems, and the book's usable organization makes reference to any desired subject a matter of ease. This book is one of a series written in the interest of the General Electric Engineering Educational Programs.



3-D Magnifier Facilitates Filing Operation

THE accompanying illustration shows a worker in the model shop at the Endicott, New York, plant of International Business Machines Corporation, performing a filing operation on a business machine part using 3-D binocular magnifier (Magni-Focuser) made by the Edroy Products Company. The magnifier has been found to increase production and ensure accuracy by providing needlesharp magnified vision in third dimension and by affording the worker free use of both hands.



Davis "Super Micrometer" stub boring tool sets give you greater machine use by eliminating cut-and-try boring. They are extremely rugged, adjustable to .0001 in.

These sets give you high-precision tools for handling heavy boring assignments from 3/8 to 7 in. diameter . . . light, extended boring up to 13 in. diameter.

Delivery is almost immediate. Sets are equipped with high-speed steel cutters, other cutters furnished on request. Some sets include offset boring heads, pencil boring heads and reducing sleeves . . . setup items, such as parallels and adjustable stop jacks.

See your representative or write for details.



Set No. 11 (illustrated) contains 7 tools covering a boring range from $1 \, l/_2$ to 7 in. Nine other standard sets to choose from. Modifications made to meet exact requirements.

If Davis can't bore it - it can't be done

Davis Boring Tool Division

GIDDINGS & LEWIS MACHINE TOOL COMPANY FOND DU LAC, WISCONSIN

Builders of plain and micrometer adjustable block type boring tools; line boring bars; special boring tools; car boring tools; planer, vertical boring and turning mill tools; Quick Change arbors and sleeves.



UNBRAKO BUTTON HEAD SOCKET SCREWS feature the following: threads to head; low head height; nonslip internal wrenching; hex socket that minimizes possibility of marred or mutilated heads; fully formed threads—Class 3 fit; heat treated alloy steel; standard sizes from #8 through %" diameter.



USE UNBRAKO BUTTON HEAD SCREWS on transportation equipment — door and window frames, paneling, seats.



On textile machinery—slashers, twisters, bobbin shields.

Have you checked our UNBRAKO standards?

We suggest you do, because a standard Unbrako delivered from your distributor's stock means faster and better service. A standard will do the job as well as a special at much lower cost. For details about Unbrako Standards, write Standard Pressed Steel Co., Jenkintown 22, Pa.



SOCKET SCREW DIVISION





On sheet metal assemblies—coolers, gasoline pumps.



UNBRAKO Standards—as listed in the SPS Catalog—are stocked by leading industrial distributors everywhere.



R. O. Deaderick Company Machine Tool Show

The first machine tool show ever held in the South, scheduled to take place in Atlanta, Georgia, on May 19, 20 and 21, is another sign of the keen



R. O. Deaderick and R. W. Fulton

national interest focused on Dixie's rushing industrial growth. A dozen of the country's leading manufacturers of metalworking machinery will demonstrate their most up-to-date machines in actual use at the Exhibition Hall of the Atlanta Biltmore Hotel throughout the three-day event. The show is sponsored by the R. O. Deaderick Company, Inc., of Knoxville and Atlanta. Several hundred industrialists, engineers, bankers and others

concerned with Southern economic progress are expected to attend. The exhibition will also be open to the general public.

About 40 examples of the latest metalworking equipment will be in operation at the show, manned by skilled operators from the factories. Companies represented will include American Tool Works Co., Cincinnati, Ohio; Avey Drilling Machine Co., Cincinnati, Ohio; Bridgeport Machines, Inc., Bridgeport, Conn.; DeVlieg Machine Co., Detroit, Mich.; Cone Automatic Machine Co., Windsor, Vt.: Covel Mfg. Co., Benton Harbor, Mich.; Gisholt Machine Co., Madison, Wis.; Nebel Machine Tool Co., Cincinnati, Ohio: Niagara Machine & Tool Works, Buffalo, N. Y.; Grob Brothers, Inc., Grafton, Wis.; Sheldon Machine Co., Inc., Chicago, Ill.; Turchan Follower Machine Co., Detroit, Mich.; and Van Norman Co., Springfield, Massachusetts.

Exhibitors at the Atlanta show include the following machines in their plans: American Tool Works Company, hydraulic duplicating lathe and a 4-ft. 11-in. radial drill; Avey Drilling Machine Company, deep hole drill, standard mill and cam feed unit; Bridgeport Machines, Inc., three Bridgeport millers, one with a ½-h.p.

head, one with a 1-h.p. head and one with a Turchan duplicator; Cone Automatic Machine Company, a color sound film on its automatic screw machine; Covel Manufacturing Company, a 35 hydraulic surface grinder and a 12 universal tool and cutter grinder; DeVlieg Machine Company, a DeVlieg 3B-48 Jigmil; Gisholt Machine Company, a 2L saddle type turret lathe, dynetric balancing machine

and superfinisher: Grob Brothers, four filing and sawing machines: Nebel Machine Tool Company, a 20-in./40in, extension bed gap lathe: Niagara Machine & Tool Works, a 1/4 in. x 10-ft. shear. a 1/4-in. x 10-ft. press brake, an AA 41/6 75-ton press and a set of 6-in. bending rolls: Sheldon Machine Company, three lathes; Turchan Follower Machine Company, a hydro - router: Van Norman Company, four ram type milling machines, a centerless grinder and a cylindrical grinder.

Among those invited to the exhibition are members of the American Society of Tool Engineers; Georgia Tech and other engineering schools; chemical

plants; electrical manufacturers; federal defense agencies; and personnel from Warner Robins Air Force Base near Macon, Georgia, which handles procurement of machine tools for the entire Air Force. Arrangements for the show are being made by Richard O. Deaderick, president; Robert W. Fulton, vice president and Atlanta office manager; and Mrs. Clara Lockett, secretary-treasurer.



bide-tipped reamer conditioning. Manual includes data on chamfer size . . . recommended clearance angles . . . method of O.D. and face of flute repair . . . special sharpening techniques for specific applications . . . diamond wheel requirements . . . other tips to improve your tool servicing technique.

WRITE FOR YOUR FREE COPY - ON YOUR BUSINESS LETTERHEAD, PLEASE.

For maximum tool economy, specify Staples Carbide-Tipped Circular Tools for reaming, core drilling, spotfacing, counterboring and end milling jobs. Standard tools from stock—special tools designed to your requirements. Write for details and tool catalog.

THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio

Staples CARBIDE-TIPPED CUTTING TOOLS

A complete line of Circular Carbide Tipped Cutting Tools

Expansion Readware Special Tools



New plant of Adamas Carbide Corporation located at Kenilworth, New Jersey

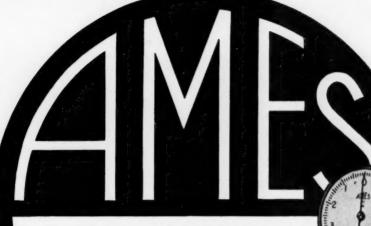
Adamas Moves into New Million-Dollar Plant

Adamas Carbide Corp., Harrison, N. J., has expanded its operations for the third time in 11 years, moving into a new, million-dollar plant located at Kenilworth, New Jersey. The new plant will increase production 50 per cent and incorporates all the latest developments of modern straight line production and quality control. The new plant has scientifically controlled atmospheric conditions throughout.

Laboratory space devoted to research and product development has been doubled.

Located on the Garden State Parkway in suburban Kenilworth, the new plant includes the modern techniques for the production of tungsten carbide tools, tool tips, dies and wear parts. In addition to tungsten carbide, the company also produces titanium carbide, tantalum carbide and columbium carbide, all of which are produced by powder metallurgy methods.





...the Preferred Small Hole Gauge No.36

Skilled and unskilled employees can use this superbly designed two-point contact gauge to make quick, accurate, impersonal inspections of small holes for size, taper and roundness.

The spherical contact point automatically centers itself and indicates the true diameter at the point measured.

The Ames Small Hole Gauge No. 36 checks holes with 3/16" to 1" diameter, up to 2" deep. Longer lengths and special contacts to check

irregular recesses, splines, available.



Ames No. 15 Jaw Gauge

Ames No. 25 Pocket Thickness Measure



Ames No. 13 Dial Comparator



Ames No. 516 Dial Micrometer



Write for your free copy of Ames' General Catalog.



Representatives in B. C. AMES CO. 29 Ames Street principal cities, B. C. AMES CO. Waltham 54. Mass.

Mfgr. of Micrometer Dial Gauges . Micrometer Dial Indicators

Nord Opens New Plant

Nord International Corp., Denville, N. J., has announced the opening of a new two-story brick and stucco plant located at 449-104 Central Ave., Orange, N. J., where the main office will now be located, in addition to the experimental and development departments. Plans are also being made to concentrate service upon the full line of Nord products at this location. Parts production from plants in New

England and New Jersey, as well as imports from Sweden, will be assembled at the new plant. A substantial amount of additional machinery and production equipment has been installed.

Blake Offers East-West Tap Sharpening Service

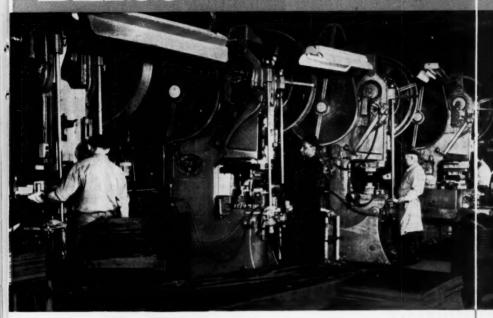
A new precision tap sharpening service inaugurated by Edward Blake





At Art Steel Company, too,

Presses Predominate



97% are Bliss-Built



Now, Art Steel Company, one of the leading manufacturers of steel office equipment-Steelmaster-credits Bliss with an important role in its progress. For Art

Steel has looked to Bliss since 1923 for engineering counsel and the right press for each operation. Seventy-three Bliss presses making up 97% of Art Steel's press equipment attest to the fact that Bliss has justified this confidence.

Asked why the continued preference for Bliss presses, Art Steel officials sum it up in one word-"dependability".

And that's why hundreds of sheet metal plants throughout this country specify Bliss presses more than any others. Whether your requirements involve mechanical or hydraulic presses, it pays to call for a Bliss engineer. He can show you why Bliss belongs in your press room, too.

BUSS on your press is more than a name... it's a guarantee

E. W. BLISS COMPANY, Canton, Ohio PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Subsidiary: The Die Supply Co., Cleveland, O. • E. W. Bliss (England) Ltd., Derby • E. W. Bliss Company (Paris) France U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan; San Jose, Cal. Branch Offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada.



New plant of Fray Machine Tool Co., Burbank, California

Fray Machine Tool Company Moves to New Plant in Burbank

Fray Machine Tool Company has moved its manufacturing-engineering services and main offices to a new, modern plant located at 2935 N. Ontario St., Burbank, Calif. The spacious new plant, covering approximately 20,000 square feet, will provide additional

shop space for greatly increased output of the company's line of universal-type milling machines and attachments. A display room will be featured where actual setups of Fray milling machines and attachments can be demonstrated. The new location provides for increased inventory storage space and room for future expansion.



STEEL HAND and POWER

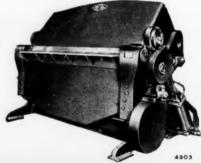
BENDING BRAKES

for Single and Quantity Runs

BENDING STEEL PLATE and SHEET METAL

Special Bending Brakes

Double Folder Brakes





for more *Accurate* cuts greater *Rigidity* in

BORING TOOLS

BORING HEADS BORING BARS



BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, 46 to 1% inches diameter. Bore holes from 1/6 to 20 inch diameter.

Accuracy for the closest talerance . Rigidity for the heavy cuts . Heat-treated parts for long wear

LARGE OFFSET SAVES TIME AND TOOL CHANGES

CRITERION MACHINE WORKS These tools will cut your baring costs.

See the complete line of CRITERION TOOL PRODUCTS at your local dealers or write for tree catalog.

9312 SANTA MONICA BLVD . BEVERLY HILLS, CALIF



(Left to right) C. W. Lindahl, chief of general engineering, Denison Engineering Company; S. H. Durbin, associate chief engineer, E. W. Bliss Company; A. J. DeMatteo, chief engineer, Watson-Stillman Company; R. V. D. Strong, chief engineer, F. J. Stokes Machine Company; William Staecker, chief engineer, E. W. Bliss Company; W. H. Bennett, director of engineering, The Hydraulic Press Manufacturing Company; T. W. Bannon, chief engineer, Clearing Machine Corporation; John M. Dolan, vice president and general sales manager, The Hydraulic Press Manufacturing Company; R. A. McGrath, assistant to general manager, National Machine Tool Builders Association; H. L. Reynolds, vice president, Verson Allsteel Press Company; E. Wiedmann, chief engineer, The Oilgear Company; F. S. Kraujalis, assistant chief engineer, Hannifin Corporation; P. J. Lindner, chief engineer, Press Division, The Hydraulic Press Manufacturing Company; and R. J. Lindsey, chief engineer, Elms Engineering Division, American Steel Foundries.

H-P-M Host to National Machine Tool Builders Committee

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, was host to members of the Hydraulic Press Engineering Standards Committee of the Hydraulic Press Group of the National Machine Tool Builders Association for its regular meeting. After the meeting members made a tour of H-P-M's





Through specialization, Card is better prepared to fulfill your most exacting threading requirements.



TAPS by CARD

Completely stocked offices at Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York, San Francisco and Seattle See your local Card distributor for prompt deliveries and helpful service

S. W. CARD MANUFACTURING CO., MANSFIELD, MASS. . DIVISION OF UNION TWIST DRILL CO. TAPS . DIES . SCREW PLATES





(Left to right) Carl M. Beach, Jack Lynch, Kent Mathias, Phil Hewett and Ken Martin

three plants. The accompanying illustration shows the various members who attended the meeting. The purpose of the committee is to establish minimum specifications for various types of presses and to establish standards which promote interchangeability of dies and other tools between presses of different manufacturers.

Cincinnati Milling Announces New Divisional Selling Organization

Cincinnati Milling and Grinding Machines, Inc., sales subsidiary of The Cincinnati Milling Machine Co., Cincinnati, Ohio, has announced a new domestic selling organization which is designed to give their customers better service and more specialized engineering assistance. Carl M. Beach

Nicholson Expanding Mandrels SAVE TIME LOST Providing Solid Arbors

Records in many shops show Nicholson expanding mandrels actually get operations completed in less time than was formerly consumed in providing solid arbors. In cases this results in a tremendous cut in "down" time. Set of 14 Nicholson mandrels replaces 209 solid arbors. For all bores 1/2" to 7"; sold singly or in sets.



For details send for BULLETIN 653 136 Oregon St., Wilkes-Barre, Pa.

W.H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS



To Make SURE That YOUR CLUTCH Application Is RIGHT

Before you approve the blueprint for your next model — double check to make sure it includes the latest improvements you can build into your product with the right type and size ROCKFORD CLUTCH. It will pay you to consult our engineers concerning technical clutch advances that will give you and your customers the advantages of better power transmission control.

ROCKFORD CLUTCH DIVISION WARNER

A 300 Catherine Street, Rockford, Illinois, U.S.A. A

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER-TAKE-OFFS.





grams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD



Walter Knapp, veteran Disston salesman from Monroe, Louisiana, explains a cutter head problem for the benefit of other men attending a recent industrial sales meeting.

continues as vice president and domestic sales manager. Serving on Mr. Beach's staff are Jack Lynch, former manager of the company's New York office and now manager of standard milling machine sales, and Kent Mathias, formerly assistant to the sales manager and now manager of standard grinding machine sales. Phil Hewett, former manager of engineering service, has been assigned to the Special Machine Tool Division as manager of special machine tool sales. Ken Martin, a member of Cincinnati's Machinery Division, is now sales manager of that division, responsible for Hydroform Deep Drawing Machines, Flamatic Hardening Machines and allied equipment.

Disston Holds Three-Day Sales Meeting

Henry Disston & Sons, Inc., recently held an important three-day sales meeting, including all of its eastern division men, at Philadelphia, Similar meetings are scheduled for the company's central and western division men. All phases of Disston's diversified industrial business were covered. including plant tours, new and expanded sales and promotion plans, a new compensation program, and a down-to-earth evening forum session where salesmen could direct any and all questions at production, engineering, advertising, methods, quality control and other company department heads.

LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

J. MILTON LUERS. 12 Pine Street, Mt. Clemens, Mich.
Produced under License Issued by John Milton Luers Patents Int.

JOHNSON BAND SAWS



BOTH WET AND DRY MODELS

SPECIFICATIONS — MODEL J

Capacity—10" rounds, 18" flats
Motor—½ H.P. Ball Bearing any voltage
available, single or polyphase (34 H.P.
on wet machine).

Wheel Diameters—16".
Floor Space—66" x 31".
Bed—11" wide, 44" long, 6" deep, 24" hig

Bed—11" wide, 44" long, 6" deep, 24" high. Overall Height (Closed)—39". Blade Length—11'5" x ¾" x 032" All Standard blades of these specifications can be used.

Weight—Approximately 750 lbs. Crated 800 lbs. Boxed for export 875 lbs. Speeds—35, 90, 130, 190 feet per

Casters—Optional at slight extra cost.

MODEL B, 5" x 10" CAPACITY ALSO AVAILABLE

WRITE FOR DETAILS

JOHNSON MANUFACTURING CORP.

ALBION, MICHIGAN



Fifteenth Management Course

The College of Engineering, State University of Iowa, has announced the 15th Management Course which is scheduled to be held June 14 through June 26, 1954, in Iowa City. Since its inception, over 1.000 representatives of American and foreign business, industrial and governmental organizations have increased their understanding of the design and application of the major management techniques. It is an intensive course for factory managers, foremen, industrial engineers, methods and time study analysts, cost accountants and office executives. The areas of production planning, job evaluation, motion and time study, wage incentives, plant layout, materials handling, quality control, and legislation, organization and policy, and public speaking are included in the course. The regular State University of Iowa teaching staff will be augmented by outstanding men from a variety of industries and other educational institutions.

Communications concerning the course should be addressed to J. Wayne Deegan, 118 Engineering Bldg., State University of Iowa, Iowa City, Iowa.

Norton Constructing Automated Crankpin Grinder

Automation has been effectively applied to precision grinding, according to a recent announcement made by Norton Co., Worcester, Mass. At the present time, Norton is building two transfer type crankpin grinders, designed to mechanize all the manual duties of the operator, as well as incorporating the most advanced equipment for accurately grinding the crankpins automatically. When using these machines, the operator will merely observe the operation, touching nothing, while all the grinding and handling functions are accomplished

uttachments.

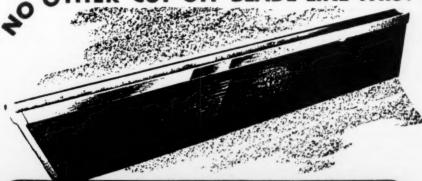
217 High St.

Use your original pulley and wheel mount o need to buy special

Write Today for Price and Delivery

New Britain, Conn.

OTHER CUT-OFF BLADE LIKE THIS!



Luers Cutting-off Blade

Empire Tool Co. is the LEADER in cut-off blade developments—backed by twenty years' experience in cut-off blade manufacture.

Cut-off blades are tools subject to conditions different from those of other taols and will perform most efficiently only when specialists' recommendations are followed.

Available from stock are blades of four types of high speed steels developed to meet the demands of cut-off operations. And on short notice you can get blades of cast alloys and tungsten carbide.

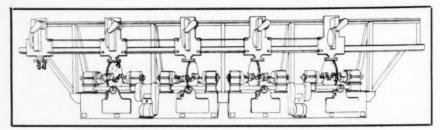
Made under license issued by John Milton Luers Patents, Inc.

Made in U.S.A.

8774 GRINNELL AVE.



DETROIT 13, MICHIGAN



Sketch of Norton Transfer Crankpin Grinder now under construction

automatically and continuously. As the crankshaft proceeds from one grinding station to the next, succeeding journals are ground until the shaft is finally deposited on a conveyor line, completely ground. A single operator is required to supervise the complete unit which has a grinding station for each crankpin to be ground.

In addition to the actual motions involved in loading and unloading and grinding the crankpins, an important feature of the transfer grinder is automatic truing of the grinding wheels at pre-determined intervals. An arrangement for automatically inspecting each crankpin after it is ground is also available on the machines now being made.

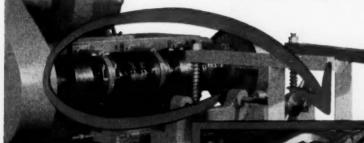
Norton's new machine is built in sections, each base section supporting two grinding wheel heads which run on flat and vee ways. Each grinding wheel head carries a 42-in, diameter grinding wheel driven by its own motor. The wheel is mounted on a rugged spindle running in sleeve bearings—one bearing on each side of the wheel.

Each base section supports two pairs of work heads which are driven by a single motor. Wheel feed is operated hydraulically with a rapid motion by cylinder and piston which moves the complete unit. Actual feed for grinding the body of the crankpin is accomplished by a large diameter feed screw which is revolved in its nut.

The transfer mechanism consists of an overhead track which is supported by a fabricated steel framework extending the whole length of the unit from loading to unloading conveyor stations. The transfer heads travel vertically to pick up and deposit the crankshafts at each station, moving simultaneously. When moving horizontally to transfer the work between stations, all heads move in unison.



Tools from LEHMANN BORING TOOL used in the multiple facing operation of this milling machine



Photos courtesy of Moline Tool Company

The hydraulic feed milling machine shown above was made by the Moline Tool Company of Moline, Illinois, for the milling of the sides of the main bearings of cylinder blocks for a large engine manufacturer.

LEHMANN BORING TOOL furnished the precision bars, heads and tungsten carbide cutters circled above which machined the multiple straddle facing operation. The close-up view at the right shows the bottom of the cylinder block and the sides of the main bearings after milling.

You can depend on LEHMANN

- For technical tooling help—for interchangeability, economy and accuracy in all your boring tool needs, whether simple or complicated.
- 35 years top engineering experience, with a wide range of practical ability to assure successful application to your needs.
- Write for Catalog BT-12, or tell us your problems for an estimate without obligation.

LEHMANN BORING TOOL

1389 Duncan Aye. St. Louis 10 Mc



THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind ... not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

Cranks in process are all picked up at the same time and moved one station to the right for grinding of succeeding pins or placing in the conveyor station for transfer to the next type of operation. While the actual grinding is being done, the traveling heads return to the pick-up position. Movements of the transfer equipment are operated hydraulically with electrical interlocks to ensure proper sequence and to stop the whole procedure should any part of the transfer or grinding equipment fail.

Thor Purchases Speedway Manufacturing Company

Thor Power Tool Co., Aurora, Ill., has expanded its broadening power tool manufacturing operations with the purchase of the Speedway Mfg. Co., Chicago, manufacturer of lowerpriced craft-type tools. The newly acquired company will continue with the same personnel at the Chicago plant and under the same management, including William B. Scace, president. and Jack R. DeBacher, vice president. The Chicago plant will operate under the name of the Speedway Manufacturing Division of Thor Power Tool Company.

The entire Speedway line will be marketed as "Thor SpeedTools" through a world-wide sales and service organization, embracing the present Thorn and Speedway sales departments and distributors. The Speed-Tools feature a portable electric orbital-motion finishing sander with a 41/2 x 51/8-in. pad capacity. The Thor SpeedTool line will also include various electric drills ranging from 1/4 to 5%-in., with the 1/4-in. models available in a wide assortment of kits with attachments for sawing, sanding, grinding, buffing, and so on. A 5-in. electric saw, two popular size bench grinders and a small hand electric

grinder complete the line.

Try the MODERN SAFETY DRILL TABLE



FREE TRIAL OFFER

For Faster, SAFER Work in Your Maintenance Department

Combines a drill table, a vise, a set of parallels and V block. No more lost fingers, from hand held jobs that slip. No more 30 minutes set-ups for a I minute drilling operation. Made in 6 sizes, from 8" to 28" dia. We guarantee each Safety Drill Table will save its cost on labor alone in 6 months, to say nothing of plant down time when vital maintenance is delayed even a few minutes.

WRITE FOR FREE FOLDER

Shows many typical set-ups, and use on radial drills. Complete specifications on all models. Covers MONEY BACK GUARANTEE and 30 DAY FREE TRIAL OFFER.



MODERN MACHINE TOOL CO.

Jackson, Michigan

N.T.D.M.A. Names Committee Heads

The appointment of new chairmen and vice chairmen for the National Tool and Die Manufacturing Association's 14 permanent committees has been announced by Herbert C. Murrer, N.T.D.M.A. president. They are as follows: Apprenticeship Committee, Jack Kleinoder, John Volkert Metal Stampings, Inc., chairman, and Richard F. Moore, Moore Special Tool Co., Inc., vice chairman: Awards Committee, F. Ray Schwenzer, Schwenzer Tool & Die Co., Inc., chairman: Business Conduct Committee, Lawrence M. Weitzel, Mechanical Specialties Co., chairman, and Joseph N. Huser, B & H Specialty Co., Inc., vice chairman; Business Management Committee, William N. Bachman, Bachman Machine Co., chairman, and Robert C. Renner, The East Dayton Tool & Die Co., vice chairman; By-Laws Commit-

Jerome H. Stanek, Stanek Tool & Mfg. Co., chairman, and Frank H. Wikstrom, Frank G. Wikstrom & Sons, Inc., vice chairman; Government Relations Committee, Fred W. Gollbach, Ace Tool and Die Co., chairman, and Benjamin C. Buerk, Buerk Tool Works, vice chairman; Industrial Relations Committee, Thomas C. Roberts, Kobzy Tool Co., chairman, and Charles P. Eisenhauer, The Universal Tool Co., vice chairman; Membership Committee, Lawrence H. Cook, Lawrence H. Cook, Inc., chairman; Planning Committee, Alfred Reinke, Gus Reinke Machinery & Tool Co., chairman, and Willis G. Ehrhardt, Ehrhardt Tool and Machine Co., vice chairman: Public Relations Committee, Philip R. Marsilius, The Producto Machine Co., chairman, and Harold G. Murdock, Arrowsmith Tool & Die Co., vice chairman; Safety Committee, John D. Dewhurst, Arrow Tool Co., Inc., chairman, and V. A. Weiland, Weiland Tool & Mfg. Co., vice chairman; and Technical Committee, John A. Barth, The Barth Corp., chairman. and F. J. Henkel, Lamina Dies & Tools, Inc., vice chairman.

tee. Walter E. L. Bock. The Superior

Die. Tool & Machine Co., chairman:

Fact-Finding Committee, Harry E.

Kohl, The International Tool Co.,

chairman, and Robert G. Nill, Fort

Wayne Tool, Die & Engineering Co.,

vice chairman; Finance Committee,



Write for illustrated folder.

SOMERSET Radius Dresser SAVES TIME

> Thousands of Somerset Dressers in service. Offer outstanding features — Wheel is dressed from below, avoids removal of guard. Stop pins permit rotation thru 180° or 90° either direction. Wearever bearing is dustproof.

SOMERSET TOOL CO. 320 Virginia St.

MILWAUKEE PRECISION EQUIPMENT

Surface Plates, Angles, Parallels, and Straight Edges are all backed by over forty years of practical experience. You pay no more for this added assurance of accuracy and durability.

J. C. BUSCH COMPANY

Engineers and Machinists Since 1907

126 E. Pittsburgh Ave.

Milwaukee 4, Wis.





Operator confidence soars—and so does production—with the Schrader Press Control. For this control is definitely a two-hand device. It is designed so that the hands that feed the die must also operate the press. Both hands must be used simultaneously for each operation and cannot stray into the danger zone when the ram comes down.

This increased safety of Schrader's Press Control lets operators build a worry-free rhythm that puts new speed in your presses.

Reduce

Danger Here

What's more, Schrader Controls end the fatigue common with mechanical foot pedal operation—a Schraderequipped press can be run as easily as a typewriter.

Wherever you have a power press—or any machine with a mechanical clutch—there's a chance to increase safety... boost operator confidence and thus increase production with a Schrader Control.

Let us help you decide what will best fit your needs. Write, describing the machines you plan to equip—or fill out the coupon below.

Schrader

products

control the air

r Mail This Coupon Today

Air Cylinders • Operating
Valves • Press & Shear
Controls • Air Ejection Sets
Blow Guns • Air Line Couplers • Air Hose & Fittings
Hose Reels • Pressure Regulators & Oliers • Air Strainers • Hydraulic Gauges
Unifiare Tube Fittings

Division of Scovill 461 Vanderbilt	DER'S SON facevill Manufacturing Company, Incorporated rbilt Avenue, Brooklyn 17, N. Y. Dept. G-1 ted in more information on			
Name				
Name	Tirle			
Company				

Cincinnati Chapter of A.S.W.A. Holds Press Luncheon

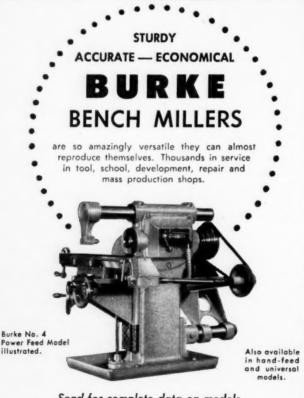
Confidence in the increasing importance of steel distributors to the Cincinnati industrial area, despite the current slowdown of business, was expressed by John E. Doxsey, assistant to the president of the American Steel Warehouse Association, Cleveland, at a press luncheon at the Cincinnati Club sponsored recently by the organization's Cincinnati Chapter. The luncheon followed a tour through

three local steel warehouses where newsmen and civic officials learned how steel is made available in small quantities to thousands of industrial concerns in the area.

During the morning, guests of the chapter visited the warehouses of Joseph T. Ryerson & Son, Inc., 3475 Spring Grove Ave.; Cincinnati Steel Products Co., 4540 Steel Place; and Williams and Co., 3231 Fredonia Avenue. In each warehouse they saw the many different types of steel available

on short notice to meet the daily requirements of all metal-using companies in the region. It was pointed out that warehouses account for the sale of nearly 20 per cent of all steel produced, and that nine of every 10 steel users purchase all their requirements from steel warehouses.

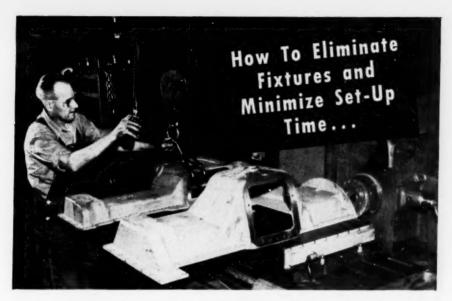
The Cincinnati Chapter of the association includes the southern half of Ohio and the western portion of Kentucky. Fred L. Pfeiffer, Neill La Vielle Supply Co., Louisville, is president of the chapter this year. Norman L. Brown, Wheelock, Lovejoy & Co., Cincinnati, made the arrangements for the tour.



Send for complete data on models, specifications and accessories.

THE U. S. BURKE MACHINE TOOL DIV.

Brotherton Road 3, Cincinnati 27, Ohio



With Sundstrand Magnetic Chucks

Here's how Caterpillar Tractor Co. uses Sundstrand magnetic chucks to eliminate fixtures and cut down set-up time. A pair of chucks are used as a permanent set-up for milling the bell end flange on 26 different oil pans. Prior to installation of the Sundstrand chucks, their pans required 7 different fix-

tures and from ½ to 1½ hours set-up time. With magnetic chucks, a throw of a switch will secure or release either or both pans instantly. If you have milling or grinding operations in your plant it will pay you to investigate

Sundstrand magnetic chucks.

Free
Data
Write for this new magnetic chuck bulletin — contains useful information on the complete line of Sundstrand Power-Grip Chucks Ask for bulletin 543-M.





SUNDSTRAND Magnetic Products Co.

Division of Sundstrand Machine Tool Co. 102D-9th St. . ROCKFORD, ILLUNOIS



New office wing of The Fellows Gear Shaper Co., Springfield, Vermont

Fellows Completes Plant Additions

The Fellows Gear Shaper Company has completed two additions to its plant in Springfield, Vermont. Office and engineering department space has been increased 7,000 sq. ft. by adding a three story wing to the office building, and a separate shop building of 26,520 sq. ft. floor space has been erected. One section of the shop building is single story, measuring 180 x 90 x 32 ft. high. This portion is equipped with crane facilities and new machines of adequate capacity for handling and machining the large castings used in such machines as the No. 10 rotary and the 120-in. gear shapers. These machines, together with several others, are also assembled in this part of the plant.

The remainder of the building is of

two-story construction. The ground floor of this section is occupied by the sheet metal and welding departments. The metallurgical department laboratory, fully equipped for chemical analysis and microscopic study of steels, and an electrical panel assembly room are located on the second floor.

SPS Completes \$10,000,000 Phase of Plant Expansion Program

Standard Pressed Steel Co., Jenkintown, Pa., has just completed a \$10,000,000 phase of a continuing program of expansion and modernization under which the firm has doubled its floor space to 650,000 sq. ft. in the last four years. The company is currently adjusting to its increased capacity, realigning divisions to give





*INSERTED TOOTH SAW

For heavy production cutting of steel, brass, copper and aluminum. Alternating square and beveled teeth "tri-vide" chips for easy cutting and clearance. Maximum saw clearance gives cooler, freer cutting ... permits extremely high rate of feed. High Speed Steel Teeth can be easily replaced singly or in complete sets, in your own plant.

*SEGMENTAL SAW

For especially smooth cuts on production work. Extra-service High Speed Steel toothed segments are securely held in a tough alloy plate by a tongue and groove design, have quick clearance for faster, freer cutting. Teeth are alternately quare and beveled for easy cutting and clearance of "tri-vided" chips. Can be sharpened on any automatic grinder.

*SOLID TOOTH SAW

For general shop cut-off jobs... for use on smaller automatic cut-off machines, and for cutting jobs where narrow kerf is important. Clearance ground and furnished in High Speed, Si-Maloy (Pat.), or Semi-High Speed Steel, Simonds own steel, plus accurate heat treating and grinding give these saws longer life, more dependable performance.



CALL YOUR SIMONDS DISTRIBUTOR TODAY

Pactory Branches in Basten, Chicago, San Francisca and Partland, Oregon Consolion Factory in Mantreal, Que. Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. Simonds Abraurie Ca., Philo., Pa., and Arvida, Que., Canada

CIRCULAR Metal Cutting SAWS

May, 1954

MODERN MACHINE SHOP

281



Aerial view of expanded plant of Standard Pressed Steel Co., Jenkintown, Pennsylvania

them more autonomy and making their key men more responsible for performance. The \$10,000,000 expansion was a projected 10-year effort telescoped, partly by the demands of Korea, into four years. Its completion was signalized by the moving of the sales and related departments into new office areas of the main building.

Under the expansion, half of which was in construction and half in new and modern machinery and equipment, SPS built a modern, integrated, one-roof plant on the site where there had been many separate buildings housing various production processes. Construction of the plant is heavy steel frame with brick facing.

COOLEY HEAT TREATING FURNACES

For Tools and Small Parts

SHOWN HERE

THE COOLEY FLOOR MODEL for HARDENING AND TEMPERING



Max. Temp.	Sizes	Price
2000°	12" x 8" x 18" 12" x 8" x 24" 12" x 8" x 36" 15" x 12" x 30"	\$1030 to \$1485

All prices are less controls. Any standard controls available for automatic temperature control.

- Cooley modern design provides natural convection—increases uniformity. Heavily insulated large area door makes for low heat loss—reduced power needs.
- · Natural thermal convection.
- · Easily removable heating elements.

Controlling Pyrometers carried in stock—available for all applications.

Free on request:

COMPLETE CATALOG

"SHOP NOTES ON HEAT TREATING"

COOLEY

ELECTRIC MANUFACTURING CORP.
34 SO. SHELBY . INDIANAPOLIS, IND.

new

Portable BAND SAW!

Cuts metal 15 times faster than a hack saw!





Take Porta-Band anywhere around the plant, in stock bins, to equipment yards, out in the field. Portable, compact, light — perfect for general maintenance or teardowns.



In tight, awkward spots like this, Porta-Band delivers smooth, controlled sawing in any position—eliminates fatigue—cuts costs.



Cuts ferrous and non-ferrous metals, "problem" materials, in bar, angle or strip form. Powered for heavy duty . . . handles toughest jobs.

Porter-Cable

Quality Electric Tools

FOR COMPLETE

PORTER-CABLE MACHINE CO.

2305 N. Salina St., Syracuse 8, N. Y.

(In Canada, send to Strongridge, Ltd., London, Ont.)
Send full information on PORTA-BAND and name of nearest

Weighs only 16 lbs. • Band speed: 240 f.p.m. Precision ball and needle bearings throughout Universal AC-DC, 25-60 cycle motor (230V available

Name_

Company_

Type of Business.

Street_

City_

____County_

Manufacturers of Speedmati: and Guild Electric Tools



Modern plant of newly-formed Carbidie Inc., Latrobe, Pennsylvania

Company Formed to Supply Preformed Carbide Sections

A new source of supply for preformed carbide sections-Carbidie Inc., located at 27 Hillview Ave., Latrobe, Pa., has been founded and is now being operated by R. J. Steele, Logan J. Harr and E. J. Reitler, whose combined talents cover more than 50 years in the carbide industry. All processing rooms of the new firm are air conditioned with the entire 4,500 sq. ft. building maintained under positive pressure with filtered air. The laboratory testing room is fully equipped and expertly manned. The shape room is designed and operated to produce accuracy in the carbide section up to 8 in. in diameter and 14 in. long. Carbidie Inc., uses the Hydrostatic Method of pressing which minimizes porosity and increases transverse rupture strength of carbide.

The new firm is set up to supply preformed carbide sections in any shape that can be machined for applications of blanking, coining, heading, extruding, forming, drawing, compacting, gages, wear parts, slitter knives, mandrels, and forming rolls. The company also offers special work in developing new grades of carbide for specific applications.

Holo-Krome Re-Elects President and Board Chairman

At its annual meeting held recently in Hartford, Connecticut, The Holo-Krome Screw Corporation re-elected W. C. Stauble as president and Graham H. Anthony as chairman of the



CUT COSTS with ALLEN Punch Press

1-Ton Power Bench Type . . . Powerful, Dependable, Economical For light work-stamping, framing, riveting-metal, fiber or other

material. material. Overall height 17/2'' . . . Base size $8/2'' \times 8/2''$. . . Die bed $5/2'' \times 8/2''$. . . Ram face $1/2'' \times 3/2''$. . . Ram streke 3/4'' . . . positive 3/4'' ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . V-belt drive . . . weight 105 lbs. The machine of a thousand uses! Adequate for many types of work now

done on large presses at greater expense.

30-DAY MONEY-BACK GUARANTEE, Order TODAY, Price \$97.50 F.O.B., Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

ALVA F. ALLEN,

Dept. MM,

CLINTON, MO.



"STANDARD for tough jobs since 1881"



as near as your telephone



Call your Industrial Supply Distributor for Shield Brand Twist Drills. Specialized factory service available everywhere.

STANDARD TOOL CO.



NEW YORK . DETROIT . CHICAGO . DALLAS . SAN FRANCISCO

board. Mr. Stauble, one of the founders of the company, was named to the presidency a year ago to succeed U. S. Senator William A. Purtell who resigned when elected to the Senate. Mr. Anthony is chairman of the executive committee of Veeder-Root, Inc., and chairman of the board of Colt's Manufacturing Company. Richard A. Modig, who joined H-K in 1935 as a salesman in the New England territory and who was later named gen-



Richard A. Modig and William J. Basile



PILOT
BUSHINGS
Frictionless

—Rotary
For core drilling, T.
C. and high speed
boring, turret tool,
piloting, etc. Won't
stick or clog. Dust
proof as a watch.
Write for details.

GATCO ROTARY BUSHING CO. 42330 Ann Arbor Road, Plymouth, Michigan



MARK OF QUALITY

STANDARD

TAPER PINS



The high quality and accuracy of Standard Steel Specialty Taper Pins have won them wide acceptance. Milled from bar stock, straight to taper and to extremely close tolerances, these pins give 100% performance. The uniformity and accuracy of the pins saves valuable time at assembly, assuring you trouble free service.

Write for complete catalog giving information on taper pins. Woodruff keys, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.

eral sales manager, was promoted to vice president in charge of sales. William J. Basile, associated with the company since 1943, was advanced from assistant treasurer to treasurer. Mr. Stauble, along with being president, had been serving as treasurer.

Paul W. Klooz and Harold A. Neff were re-elected vice presidents, and the board of directors was renamed as follows: Mr. Anthony, Mr. Stauble, John H. Chaplin, Harvey L. Spaunberg, Lucius F. Robinson, Jr., Milton H. Glover and Ralph L. Damon.

Custom Made Stamped Wrench Service

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., has announced the ability to produce custom-made diecut wrenches in small lots without conventional tooling costs. In the supplying of special wrenches for various equipment where a stock wrench is



The world's best . . . one-piece, drop-forged—not weldedof mild carbon sheel, heat-ineted, with head accurately
milled for standard tables on lathes, planers, boring mills,
milling machines. Integral washer and not. Sizes up to
30°. Typical direct prices for 10° lengths: 1y-51.36;
½—31.36; ½—31.38; ½—31.39. Write for price list.
THE 6 K TOOL COMPATY, INC., millford 4, N. H.

This is GORTON Pantography

Ready to Help You

Photo shows a standard P3-2 profiling ports in an aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is paraStandard P3-2 Pantagraph with special indexing knee fixture and automatic tooling.

bolic. A combination of other methods would do the cutting in hours, but the P3-2, with an automatic cutting cycle, finishes each port in 2.3 minutes.

Improve Production and Lower Costs

Gorton tracer-controlled equipment does efficient profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving and many other standard or special operations. You can expect high accuracy and high surface finish, whether your work involves metals or plastics in flat, uniformly curved, cylindrical or irregular shapes.

Enlarged templates, masters or patterns, all quickly and easily made, give

Gorton Pantographs advantages of increased accuracy through reduction ratios. Work pieces range in size from the diameter of a dime to 10 feet. Cutting cycle is accomplished manually or automatically.

Fill out and mail the coupon for your copies of the Gorton catalog and the informative booklet, "Pantography."







City. State

1705 Racine St., Racine, Wis., U.S.A.

Plea	se	send	at	once	comp	lete	inform	ation	about
the	G	orton	line	conta	ined	in	Bulletin	1655	1705

Firm......Name.....

A 7786-1P-A



Illustration showing typical Dayton Rogers
Custom Made Stamped Wrench

not suitable, the company has developed a method of producing practically any type of box or open end wrench by a stamping method. The custom made wrenches can be made in practically any size up to and including an overall length of 20 inches. They can be blanked and pierced from most any sheet metal alloy and heat

treated to the desired specification. According to the manufacturer, the method makes it possible for equipment manufacturers to supply special wrenches with their apparatus where, under ordinary conditions, it would be prohibitive.

J. A. Carmien Assumes Presidency of New Plastic Corporation

New Plastic Corp., Los Angeles, Calif., has announced several changes in executive personnel. J. Allen Carmien, former executive vice president, assumed the presidency of the company, and W. C. Fortier, former treasurer, has been promoted to vice president and treasurer. Mr. Carmien has acquired controlling stock interests and will direct the policy of the company in the future. Fred S. Jahn resigned as president and director at a recent meeting of the board of directors. New Plastic Corporation man-



Another first ...for Delpark Filtration

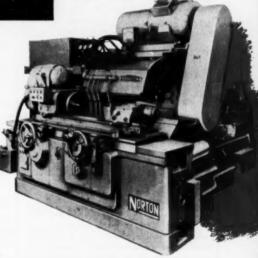
NORTON'S GRINDER Features *Built-in* Delpark Filtration

Recognition by Norton engineers of DELPARK as the finest in coolant filtration is acknowledged by the incorporating of DELPARK Filtration into the design of a new grinding machine introduced by Norton.

This machine is the Norton Type CM-1 Heavy Duty Semiautomatic Multi-Wheel Grinder. This unit utilizes several grinding wheels mounted between bearings for simultaneously grinding different diameters on the work piece in a single plunge-grind operation. Heavy sludge loads produced are immediately removed eliminating time loss necessary to clean reservoirs. Coolant supply is constantly kept clean and free of particles which would spoil the finish of ground work.

Thank you Norton, for your recognition of DELPARK Filtration as the finest.

Write for the Delpark brochure on





Norton Type CM-1 Heavy Duty Semi atic Multi-Wheel Grinder with built-in Delpark Filtration

BACKED BY MORE THAN 30 YEARS EXPERIENCE IN INDUSTRIAL FILTRATION

ufactures "Nupla" soft-faced tools, including replaceable tipped hammers, mallets and drive punches.

Lincoln Electric Names "Dealer of The Year"

R. B. Cave, owner of Dakota Welding Supply Co., Watertown, S. D., has been named "Dealer of the Year" for 1953 by The Lincoln Electric Co., Cleveland, Ohio. Lincoln annually selects from among its 1,000 dealers

6" Universal Dividing Head with DIRECT INDEXING

Optional SWIYEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Folder

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. •

Cincinnati, Ohio

the man who has made outstanding achievements in performance and development. An illuminated scroll is presented to the dealer so honored. Dick Cave received the scroll for his uncle at the Lincoln plant during a recent dealer meeting. The award was made to Dakota Welding Supply Company this year because their business in Lincoln equipment during 1953 increased by 250 per cent over 1952. Mr. Cave has been a Lincoln Weldealer for over seven years. The major portion of this increase was in sales to farmers, reflecting an active educational and promotion program.

During 1953, the organization conducted 60 farm welding clinics to demonstrate welding methods and equipment, and ran six welding schools to teach farmers how to weld. They conducted three schools for training vocational agriculture teachers in their area. In addition to this, they carried on an extensive advertising program locally and participated in local county fairs and the state fair. Mr. Cave feels this activity contributed much to the outstanding sales increase in 1953.

For further information on any product mentioned in this issue—use the READER SERV-ICE CARDS between the covers.

PIN GAGE HANDLE

Bushings for cylindrical and thread plug gages.



RED

GREEN

Complete line of gage supplies, handles, blanks, ring gage parts, etc. from stock.

HURON MACHINE PRODUCTS INC. 6252 Monroe Boulevard

Clamping Device on Abrasive Cut-off Saw Operated by NOPAK

MODEL E CYLINDER



This efficient clamping device was developed by a Canadian distributor of industrial supplies, to speed up and simplify the crosscutting of pipe, rod stock, angle iron and other shapes. A NOPAK 2" x 6" Model "E" Cylinder, suspended from the top of an "A" frame, supplies the downward pushing power which holds the stock firmly in place while the abrasive saw does the cutting quickly, squarely and accurately.

Cylinder is actuated by a NOPAK Model "F" Foot Operated Valve which leaves operator's hands free ... and enables him to move about between cuts until he again steps on foot lever to release clamp. Slow, manual manipulation of clamps or vises is completely eliminated, valuable time and effort is saved.

NOPAK Cylinders and Valves are used throughout industry, in thousands of similar applications, to accelerate production, reduce costs, minimize fatigue. Ask your NOPAK representative to show you the NOPAK Application Manual.



NOPAK Model "F" Foot Valve

GALLAND-HENNING NOPAK DIVISION

2758 SOUTH 31ST STREET

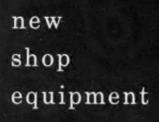
MILWAUKEE 46, WISCONSIN

Refer to Sweet's File for Product Designers or write for Bulletin SW-2.

> Representatives in Principal Cities

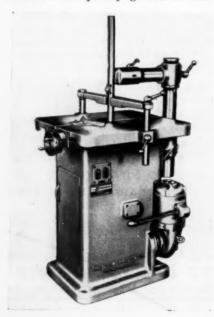


A 7878-1/2-IA



Keyseater Has Scraped Bearings Between Table and Base

The D. C. Morrison Co., P.O. Box 1017B, Cincinnati 1, Ohio, has announced a 1-in. keyseater which features long, fully scraped bearings between the table and the base and which is adequately gibbed to com-



pensate for wear over a long period of time. The workpiece is fed into the cutting tool, and the single cutter takes the cut the full length of the work before backing out and relieving itself. An automatic feed is said to ensure accuracy and enable the operator to prepare for the next setup. An automatic stop automatically cuts off the feed for any given depth. The stroke of the machine can be adjusted and set from 6 to 9 in., and automatic centering centers up the workpiece quickly and easily. Automatic lubrication feeds oil to all necessary moving parts by means of a "one shot" system which is convenient to the operator.

The machine is capable of cutting keyways ranging from 1/16 to 1 in. deep, and the maximum length of cut is $8\frac{1}{2}$ in. The cutter bar, which accommodates interchangeable cutters, is supported close to the actual cut by a quick-acting, adjustable cutter bar support. Standard equipment includes a $1\frac{1}{2}$ -h.p., three-phase, 60-cycle, 220/440-volt, a.c. motor; start, stop, jog, push-button station; mag-

Morrison 1-Inch Keysegter



netic starter with heaters; centering vee; and holding clamp bar. A taper attachment can be supplied for cutting tapered keyways. Cutter bars and cutters are furnished to meet individual requirements. The machine utilizes a 24 x 27 in. table and requires a floor space measuring 36 x 36 inches.

Universal Grinding Machine Features Rising and Falling Swiveling Wheelhead

A. A. Jones & Shipman Ltd., Narborough Road South, Leicester, England, has announced the Model 1204/ EIUR Universal Grinding Machine which is designed for all kinds of external grinding and which features a rising and falling swiveling wheelhead for handling all types of cutter and tool grinding operations. The wheelhead is fully universal and is carried on a column which is mounted on a large diameter boss, fully graduated on the base to enable swiveling to any required angle. The wheel spindle carries an external grinding wheel for cylindrical grinding and a cup wheel for tool and cutter grinding. The wheelhead is powered by a 11/2-h.p. motor and has a vertical traverse of 61/4 in. and a cross traverse of 716 inches.

Jones & Shipman Model 1204/EIUR Universal Grinding Machine

Vise Set Utilizes T-Slot Table

Designated as the "Repco," a vise set which consists of two independent members and which utilizes any T-slot table as its base has been announced by Rockford Engineered Products Co., Rockford, Ill. The capacity of the unit is limited only by the length of the machine table on which it is used, and the workpiece locates directly on the machine table. Special soft jaws are available to hold shafts between centers for milling slots, flats and keyways. Used independently, the rigid base can serve as a useful angle block, and the adjustable clamp base can be used as a separate clamping device to hold work against stops. Key slots are provided in both directions for accurately locating the vise either parallel to or at a right angle to the table slots. Eight conveniently located 1/2-13 tapped holes accommodate hold-down straps, stops, and so on. The clamp jaw is driven by an Acme screw through a bronze nut and guided by two hardened and ground steel guide pins.



Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs,
43 in.	30 in.	800 lbs.

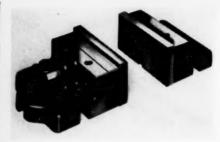
FREE DATA



You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 540.



SUNDSTRAND MACHINE TOOL CO. 2539 Eleventh Street, Rockford, III., U.S.A.



"Repco" Vise Set

The vise is available in jaw widths of either 6 or 8 in. and with key slots of 11/16 or 13/16 in. respectively. A wrench and one set of soft jaws are included as standard equipment.

Automatic Hydraulic Coolant Valve for Grinding Machines

An automatic hydraulic coolant valve for grinding machines has been announced by Cleveland Industrial Tool Co., Inc., 1080 E. 222nd St., Cleveland 17, Ohio. According to the manufacturer, the device automatically turns the coolant to the diamond wheel dressing tool on and off at each dressing cycle, thus eliminating the possibility of shattered diamonds due to negligence on the part of the operator in turning on the coolant.

Citco Automatic Hydraulic Coolant Valve installed on centerless grinder







.... every lathe part and sub-assembly illustrated, named, numbered and positioned on explanatory exploded drawings.

.... a section which illustrates and describes each of over 50 modern Attachments and Accessories to make your Sheldon Lathe even more versatile, productive and valuable to you.

To get this valuable Parts List (and Accessory) Manual just write (1) the serial number of your Sheldon Lathe and (2) your name, and (3) your firm name and address, on a post card, letterhead, billhead or slip of paper and mail it to "Parts Manual".

SHELDON MACHINE CO., INC.

4250 North Knox Ave.,

Chicago 41, Illinois





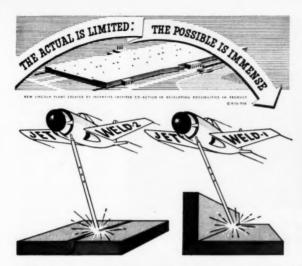
Squaring Shear Is Available in 18 Models

A redesigned squaring shear line which has been expanded to include 18 models available in 8 power-driven. 6 foot and 4 air types has been announced by Famco Machine Co., 3122 Sheridan Rd., Kenosha, Wis. Capacities of the shears range from 20 to 14gauge mild steel in 22 to 72-inch sheet widths. Special knives are available for plastics and paper shearing. Each shear is of rigid all-steel box-type construction, and features completely reversible four-edged alloy steel knives and all-steel bed and upper knife frame of box-type construction, especially designed to eliminate spring. The foot shear is designed to cut 16 and 18gauge mild steel in 36, 42, and 52-inch widths, and 18-gauge mild steel in 22,

30, and 72-inch widths. The air shear is said to cut 16-gauge mild steel in 36, 42, 52, and 72-inch widths. This particular shear is piped and shipped ready for operation complete with all air equipment.

The power-driven shear, including the Model 1672 illustrated herewith. features a fast-acting "Electromatic" clutch, which is an instant-action electrically - controlled nine - point jaw clutch. Four models in the power-driven line have the Electromatic clutch mechanism combined with a rugged gear transmission to provide power to shear 14 and 16 gauge mild steel in 36. 42, 52, and 72-inch widths. The four other models in the line are supplied with the Electromatic clutch only and shear 18 and 20-gauge mild steel in 36, 42, 52, and 72-inch widths. Standard equipment for the power-driven shear includes front, back, and side gages; hold-down; a movable electric foot switch; Textolite gibs; four-edged knives; a motor; and a magnetic starter.





JETWELD'S COST-CUTTING TEAM **SPEEDS WELDING 35% AND MORE**

FOR THE FIRST TIME, Lincoln Jetweld joins powdered metal with the electrode to achieve fastest hand welding speeds ever accomplished. Jetweld's phenomenal speed lies in utilizing the maximum heat of the arc for melting the parent metal, core wire and coating

GET JETWELD'S COST-CUTTING FACTS TODAY ... Have your Lincoln welding engineer demonstrate Jetweld's many cost saving features. Or write for free Bulletin 481.

JETWELD -2 (E-6020) Extra fast electrode for flat, deep grooves and flat and horizontal fillets.

Tensile strength (As welded) 62,000 psi minimum

Yield strength (As welded) 52,000 psi minimu

Elongation in 2" (As welded)
25% minimum

weld electrodes have been tested and approved by the American Bureau of pping and are certified to conform to AWS classes E-7020 (Jotweld 1) and

This certification authorizes the use of these two electrodes in shipbuilding supervised by the American Bureau of Shipping and the U. S. Coast Guard.

BENEFIT THREE WAYS WITH LINCOLN JETWELD



35% AND FASTER welding speeds are possible with the new Lincoln Jetweld electrodes. That's because powdered metal coatings utilize the heat of the arc more efficiently to increase welding speeds. Iron powder, melted by excess heat available in the arc, becomes an additional source of metal for the weld.



HIGHER QUALITY Weld metal is uniform, of X-ray quality, free of undercut with improved impact values at low temperatures. There is no coating breakdown . . . stub losses are less. Bead appearance is smooth . . . looks like an automatic weld.



LESS CLEANING is required with Jetweld. Heavy coating and short arc prevent spatter. Slag is self-cleaning. Excellent "wash-up" eliminates undercutting and entrapped slag.

THE LINCOLN ELECTRIC COMPANY

JETWELD-1

(F-7020)

65,000-75,000 psi

25%-30%

Extra fast electrode for flat and horizontal fillets.

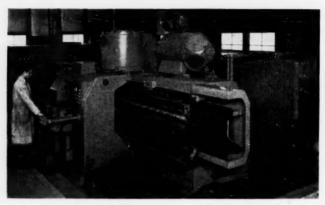
Tensile strength (Stress relieved) 80,000—90,000 psi

Yield strength (Stress relieved)

Elongation in 2" (Stress relieved)

CLEVELAND 17, OHIO

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT



Broaching Machine Has Hydraulically Actuated Fixture

Designated as the Model HM-25-130, a standard high-speed, double-acting, mechanical drive, electrically-controlled broaching machine with a hydrauColonial Model HM-25-130 Broaching Machine tooled for twopass broaching cycle on automotive bearing cap clusters

lically actuated fixture and designed for a wide range of broaching operations has been announced by Colonial Broach Co., P.O. Box 37, Harper Station,

Detroit 13, Mich. The 25-ton machine has a maximum stroke of 130 inches, and ram speed is said to be infinitely variable from 30 to 150 s.f.p.m. in both directions. According to the manufacturer, both the ram and the length of stroke can be increased to





THE SERVICE YOU WANT!

NO NEED to look up a supply source every time you buy Bronze Bearings and Bars. Your industrial distributor is permanently situated in your local area to serve you with Bunting Products and an infinite variety of countless other items.

YOUR BUNTING distributor is the leading industrial distributor, or a stock-carrying specialist in certain industrial items. With moneysaving convenience, he can supply hundreds of different sizes of completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars.

Bunting

BRONZE BEARINGS . BUSHINGS . PRECISION BRONZE BARS

Ask him for a Bunting Catalog which gives complete dimensional and technical data.



The Burning Brass & Bronze Company • Toledo 1, Ohio • Branches in Principal Cifies • Distributors Everywhere



Errington specializes in the manufacture of high speed multiple drilling and tapping attachments. The name Errington is your assurance of top-quality products . . . your assurance of the finest and most modern tools to produce first-grade workmanship at minimum operating costs.

QUICK-CHANGE

Tool-Holders to Drill, Tap and Set Studs, etc., without moving work, or stopping or reversing machine. Individual friction adjustment in each tap-holder, if required.

POSITIVE

For through holes where work is drilled and then re-handled and tapped.

BALL BEARING CONE-DRIVE

Designed for Ball Bearing High Speed Drill Press.

These Tappers may also be adapted for button or acorn die threading.

Write for Complete Information

ERRINGTON Mechanical Laboratory Inc.

meet even higher requirements for specific broaching operations. The width of the ram is 24 inches, and all electrical and hydraulic equipment is installed to J.I.C. standards. Automatic pressure lubrication is used throughout, and the ways are hardened and ground.

Floor space requirements for the machine are 194 x 290 inches, including all cabinets and a motor-generator set. Overall height is 96 inches, and the gross weight is approximately 80,000 lbs. Drive for the ram is supplied by a d.c. motor rated at 150 h.p. at 750 r.p.m. The motor is coupled to an 18-inch center distance, 20 to 1 ratio, Cone - Drive, double - enveloping worm gear set driving a precisionground helical pinion which, in turn, drives a rack to provide smooth, high capacity drive for the ram. The machine is said to be capable of developing a peak of 300 horsepower.

Machine Shaves Internal Spur or Helical Gears from 3 to 12-Inch Pitch Diameter

Designated as the Model GCR, a Red Ring Gear Shaving Machine for precision shaving operations on internal spur and helical gears from 3 to 12-inch pitch diameter has been announced by National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. The machine is designed specifically to finish only internal gears having up to 4 diametral pitch teeth and face widths up to 21/2 inches. The workhead is designed to permit the installation of either pot-type or diaphragm work - holding chucks. The hollow workhead spindle is mounted on precision tapered roller bearings and is driven by an individual motor through a worm drive and change gears. The workhead can be locked in positions up to 11/2 degrees each side of a vertical center line to permit taper shaving operations. An optional piA AVAILABILITY

SERVICE

QUALITY

you get all three with

B&W CARBON STEEL

SEAMLESS

MECHANICAL TUBING



AVAILABILITY

Buying convenience through a single source of hot-finished and cold-finished carbon steel tubing, produced in a wide range of grades and sizes.



SERVICE

You can save through the dependable assistance of B&W Regional Representatives and qualified distributors, trained to help solve fabrication problems and to assist in tube selection.



QUALITY

Mechanical properties, machinability, tolerances and surface finishes combined for ease of fabrication in your specific application.

remember

is meant for you.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION

Beaver Falls, Pa. Seamless Tubing: Welded Steinless Steel Tubing
Alliance Obion Welded Carbon Steel Tubing



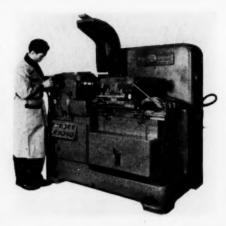
TA-4048 (CSM)

voted workhead mounting permits the head to pivot upward to a 30-degree angle to the cutter center line, thus permitting long stemmed gears to be easily loaded and unloaded.

The cutter spindle is mounted on the knee by a double slide arrangement. The entire spindle and upper slide assembly are reciprocated back and forth during the shaving operation by a lead screw and nut arrangement. An individual motor drives the lead screw







Red Ring Model GCR Internal Gear Shaving
Machine in use

through reduction drives and change gears. Adjustable stops control the length of stroke for this action. A differential up-feed mechanism is housed in the knee of the machine, providing automatic precision upfeed in selected increments throughout the shaving cycle and automatic return to correct backlash position for loading and unloading. The machine measures 621/2 inches wide x 39% inches deep x 64 inches high. A 3-h.p. motor powers the work spindle, and the cutter reciprocating mechanism is driven by a 1/4h.p. motor. Coolant is supplied by a gear-type coolant pump driven by a 1/4 -h.p. motor.



For Precision Control OVER SURFACE FINISHING OF INTERNAL BORES



"HIT OR MISS" methods can never do . . .

PRECISION is imperative.

Close tolerances up to .0001 (±) are achieved by cutting away internal bores in ferrous and nonferrous metals, glass, plastic and other materials.

Quick . . . economical . . . mathematically accurate.

for cylinder blocks, connecting rods, blind end cylinders, hydraulic cylinders, 4-way valves, gears, etc.

> WRITE for our bulletin on honing.

Photo taken in plant of National Supply Co., Toledo, Ohio.

FIRST NATIONAL BANK BLDG.

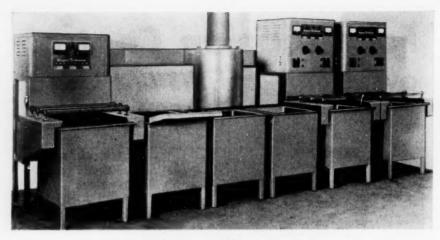
C. ALLEN FULMER CO.

EINCINNATI 2, OHIO

May, 1954

MODERN MACHINE SHOP

303



Wagner Precision Hard Chrome Plating Unit

Precision Hard Chrome Plating Unit Provides for On-the-Spot Chrome Finishing

For on-the-spot chrome finishing of production tools and parts, Wagner Brothers, Inc., 424 Midland Ave., Detroit 3, Mich., has developed a package precision hard chrome plating unit which incorporates the exclusive features of the Morey process for precision hard (industrial) chrome plating. The manufacturer states that all equipment necessary for a complete hard chrome department is furnished; namely, six tanks, lead and neoprene tank linings, five rectifiers, a fume

separation system, heat and timing controls, and electrical connections, ready for immediate installation. An intensive course of instruction in the advanced phases of precision plating is offered as a part of the process.

According to the manufacturer, the unit will plate with exact duplication of original finish, in deep threads, or to the keenest cutting edge. It is said to produce an extremely hard surface, thus greatly prolonging tool life. Because of its inherent advantages of hardness and low coefficient of friction, chromium is widely used for increasing service life of parts subject





Again, Lincoln Park Industries steps forward with a new development in snap gages that means further help to your production. Note these real advantages:

SIMPLIFIED DESIGN & CONSTRUCTION—Lincoln Park Dial Snap Gages are designed to give a direct reading from the measuring anvil to indicator. There are no bearings, levers or cams to get out of adjustment.

PRECISION ADJUSTMENTS—By means of its fine pitch ground thread screw attachment, the upper anvil can be adjusted within a $\frac{1}{4}$ " range.

WEAR-RESISTANT ANVILS—The parallel anvils are supplied either carbide tipped or Carb-o-Plated.

SHOCKPROOF—Even when Lincoln Park Dial Snap Gages are used by inexperienced operators, there is no possibility of damage by accidental shock. The indicators themselves are encased in a housing to protect them from damage.

CHOICE OF INDICATORS—Any A.G.D. size indicator can be used.

LONG LIFE—Because these gages have a minimum of parts to wear or be replaced, maintenance is negligible and long, trouble-free operation is assured.

Lincoln Fark

THE PLUS IN PRECISION

INDUSTRIES, INC.

LINCOLN PARK 25, MICHIGAN

DESIGNERS AND MANUFACTURERS OF: SPECIAL AND STANDARD CARBIDE CHROME PLATED AND STEEL GAGES
CARBIDE ROTARY FILES + ALSO FACILITIES AND SKILLED PERSONNEL AVAILABLE FOR PRECISION PARTS PRODUCTION



to wear and abrasion. Undersize tools and parts are easily restored to their original print dimensions.

now features a tarnish- and rust-proof satin chrome finish which makes the outside surfaces as durable as the me-

Improved Height Gage Features Satin Chrome Finish

Several improvements have been made on the Fairfield Micro-Height Gage now being marketed by The Cleveland Instrument Co., 735 Carnegie Ave., Cleveland, Ohio. The gage





Diameter up to .125" — Length up to 1" Hardened and Ground

Taper Tolerance .0001" In Length Of Pin Diameter Tolerance .0005"

Send Specifications for Quotations

COMMERCIAL
CENTERLESS
GRINDING CO.
5505 CEDAR AYE Phone EN 1-3412 CLEYELAND 3, 0.

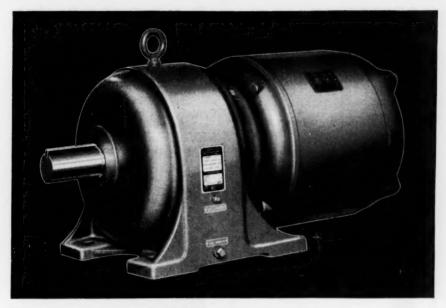


Fairfield Improved Micro-Height Gage

chanism in the gage. A 3-in. hardened, ground and lapped standard riser is now available. The gage has direct capacities from zero at the base to 3 in., in thousandths; however, the addition of the riser extends the range of the gage to 6 inches.

The gage reads exactly like a micrometer and is supplied with a scriber for use by layout men and toolmakers. By replacing the scriber with a dial indicator, the gage can be used to measure distances between holes or surfaces.





The power you need at the speed you need it . . .

HOWELL GEAR MOTORS

New dependability, greater starting torque and top efficiency, with output speeds as low as 7.5 rpm. are now available in Howell Gear Motors.

This compact, single-unit motor may well be the answer to your gear reduction problems. Combining the finest heavy duty gearing with top quality industrial motors, Howell Gear Motors reduce drive failures and downtime.

Howell Gear Motors use duti-rated, lifetime gearing, with file-hard tooth surfaces and tough, resilient cores. They are available in all types of enclosures, from 7.5 to 780 rpm. with a capacity range from 1 to 30 hp., in all three AGMA service classifications.

For full information on Howell Gear Motors, contact the Howell man in your area, or write the factory direct for Bulletin GM-1.



HOWELL MOTORS

HOWELL ELECTRIC MOTORS COMPANY, HOWELL, MICHIGAN

PRECISION-BUILT MOTORS FOR INDUSTRY SINCE 1915

GAMMONS-

TAPER REAMERS for all types of die work

- Specially treated for modern die steels.
- Rapid cutting capacity.
- Large range of standard sizes.
- Tapers per inch:
 .005, .008, .013.

GAMMONS . HOAGLUND CO.

MANCHESTER 2, CONN.
Manufacturers of helical taper pln, chucking,
die makers and special reamers.

Plastic Melting Tank Provides Fast, Uniform Heating

Designated as the Model 35, a plastic melting tank which is said to provide fast, uniform heating for top plastic dipping performance has been announced by Evens-Thompson Mfg. Co., 11360 Kaltz Ave., P.O. Box 181, Center Line, Mich. The tank features an all-cast aluminum melting unit with an inward-pitched self-draining top which is designed to eliminate



Evens-Thompson Model 35 Plastic Melting Tank

messy overflow and caking of the plastic. The tank is equipped with Robertshaw precision controls and chrome-steel sheathed electric heating elements. Having a dipping capacity of 3.6 gal., the unit measures 15 x 18 x 19 in. overall.

The Evens - Thompson Model 35 Plastic Melting Tank was previously described on page 409 of the March 1954 issue of MODERN MACHINE SHOP; however, the illustration used was incorrect. The illustration included herewith is the correct one.



WHY WAIT FOR SPECIAL TAPS?

Hes them IN STOCK for IMMEDIATE DELIVERY!

HIGH SPEED SPECIAL RIGHT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	7/16	12-16-18-22-24-27-28-	1-5/8	51/2-8-10-12-13-16-18-
5	30-32-36-48-80		30-32-36-40		20-24
6	36-40-48-56-60	1/2	12-14-16-18-22-24-26-	1-11/16	10-12-14-16-18-20-24
7	32-40		27-28-30-32-40	1-3/4	8-10-12-14-16-18-20-24
8	24-30-36-38-40-44-48	9/16	16-20-24-27-28-30-32-	1-13/16	8-10-12-14-16-18-20
9	24-28-32-40		40-48	1-7/8	8-10-12-14-16-18-20-24
10	28-30-36-40-48-64	5/8	12-14-16-20-24-27-28-	1-15/16	8-10-12-14-16-
12	20-28-32-36		32-36-40		18-20-24-28
14	20-24-28	11/16	11-16-18-20-24-27-28-	2	41/2-8-10-12-
1/16	60-64		30-32	-	16-18-20
		3/4	9-11-12-14-18-20-24-	2-1/16	12-14
5/64	72	13/16	26-27-28-32 10-14-18-20-32	2-1/8	12-16-20
3/32	48	7/8	10-12-16-18-20-24-27-	2-3/16	12-16
7/64	48-56	//0	28-32	2-1/4	41/2-8-12-
1/8	32-40	15/16	8-9-10-12-14-16-18-	/-	14-16-18
5/32	32-36-40	1.0,	20-24-32	2-5/16	12-18
9/64	36-40	1	10-12-16-18-20-24-27-	2-3/8	12-16-18
11/64	36		32-40	2-1/2	8-10-12
3/16	20-24-32	1-1/16	12-14-16-18-20-24	2-9/16	18
13/64	32	1-1/8	8-10-14-16-18-20-24-32	2-5/8	12-16-20
7/32	24-28-32	1-3/16	8-10-12-14-16-18-20-24	2-3/4	16
1/4	18-24-26-27-30-32-	1-1/4	8-10-14-16-18-20-24-32	2-7/8	12-16-20 16 8-12-16
	36-40	1-5/16	12-14-16-18-20-24-32	3	0.10
5/16	16-20-22-27-28-32-40	1-3/8	8-10-14-16-18-20-24 8-10-12-16-18-20-24	3-1/4	8-12-16
3/8	12-16-18-20-27-28-32-	1-1/2	8-10-14-16-18-20-24-28	3-1/2 3-7/8	8-12-16
-, -	36-40-48	1-9/16	18-20-24	4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56 32-36-40-48	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
5	40-44	5/8	11-12-18-20-24 11-16-24	1-5/8	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-11/16	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-3/4	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-13/16	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-7/8	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	1-15/16	8-10-12-14-16-18-20
5/16	18-20-24-28-32	1-1/4	7-12-16-18	2	41/2-10-12

SPECIAL AND LEFT HAND DIES IN STOCK

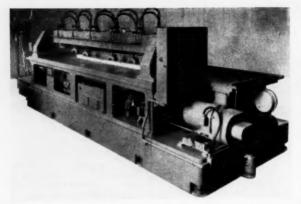
NOTE: Oversize—Undersize—Metric—64th—and 32nd Size Taps Available for Quick Delivery.
We stock special sizes in High Speed Milling
Cutters, Slitting Saws, End Mills and Reamers.

DEALER INQUIRIES INVITED

TOOL COMPANY, INC. CUTTING TOOL SPECIALISTS

126 LAFAVETTE STREET - NEW YORK 13, N. Y.





Saw Handles Aluminum Plates up to 4 Inches Thick x 12 Feet Long

The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio, has announced a high speed plate saw which is designed to accurately handle aluminum plates up to 4 inches thick x 12 feet long. The coolant sump, chip compartment, and chip conveyor are built into the base of the machine, and the hydraulic tank and pump, with its motor, are in a centrally-located recess. The surface of the plate is equipped with free rollers in small cylinders, actuated hydraulically to raise the stock from the surface of the table, thus enabling the operator to position the stock easily. Rollers are provided in two directions. each under the control of the operator, and the stock is clamped by a

heavy rail with directacting hydraulic-cylinder hold-down clamps. The clamping units can be positioned along the rail to the most desirable position, depending upon the length of stock. Each clamp has a shutoff valve to make it inoperative if it is not needed.

A single-speed saw head is mounted on a dovetail slide beneath the table. Variable feed rate of the saw head is provided by a variable-speed drive at the right-hand end of the table through a feed screw and nut arrangement. An automatic cable take-up reel supports the power cable to the motor on the saw head carriage. An adjustable fence squares up the stock.

Carbide Tool Grinder Is Available in Bench or Floor Model

The Standard Electrical Tool Co.. 2487 River Rd., Cincinnati 4, Ohio, has announced a 6-in. heavy-duty carbide tool grinder which is available in either a bench model or with a floor pedestal. The grinder utilizes a 34-h. 3,600-r.p.m. motor, supplied for



CARROLL AND JAMIESON LATHES

• This 16" lathe is equipped with 12 speed geared head, motor drive, and Timken mounted spindle. It's modern in design - with liberal dimensions.

Write today for descriptive bulletin 39-A-10.

CARROLL & JAMIESON MACHINE TOOL CO. .:

MÄGERLE (SWISS) HYDRAULIC SURFACE GRINDERS



- A work measuring instrument shows the difference between work size and required final size during operation.
- The automatic feeding and sizing is powered by a separate electrical unit.
- The built in diamond wheel dresser automatically resets the final sizing mechanism for wheel wear.
- The machine requires no attendance during the grinding operation.
- Finishes within .0002 are secured on repeated chuck loadings automatically.
- Rapid traverse is provided for both head and crossslide.
- · Furnished with heavy duty cartridge spindle assembly.
- Available with infinitely variable grinding wheel speed.
- Extremely rugged construction and very easy to operate.
- . Available in 2 foot, 3 foot and 4 foot models.

Write for our eight page illustrated brochure.

PELLOW MACHINE CO.

13500 FOLEY AVENUE . DETROIT 27, MICHIGAN

Columbia

TOOL STEELS for all tools for all purposes

HOT WORK-SHOCK RESISTING:

Formite Firedie Formite No. 2 Buster C.E.C.

TOOL TOOL STEELS

COLUMBIA TOOL STEEL COMPANY

Main Office & Works Chicago Heights 6, III.

W.H.O. SAYS:

Don't have FITS
over FASTENERS,
over FASTENERS,
have fasteners
that fit."

For the finest in
milled-from-the-bar
cap screws, set screws,

DON'T GET STUCK, STICK TO THE ONES MADE BY

coupling bolts and milled studs

Wm. H. Ottemiller Co. YORK, PA.



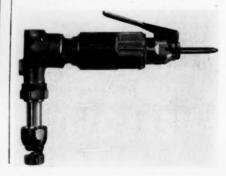
Standard 6-Inch Heavy-Duty Bench-Type Carbide Tool Grinder

either single- or three-phase current. Standard equipment for the machine includes forward-off-reverse control switch and steel wheel guards which are adjustable for wear. Heavy work tables on each side, measuring 10 x 7 in., are adjustable 10 degrees above to 20 degrees below the horizontal axis. The machine is said to be suitable for either grinding or diamond wheels.

Air-Powered Nibbler Cuts Sheet Metal up to 18 Gauge

Buckeye Tools Corp., Division No. 27, P.O. Box 966, Dayton 1, Ohio, has announced a portable air - powered nibbler which is capable of cutting sheet metal up to 18 gauge. The tool has an extended head which permits its use in confined areas and in formed metal panels. Cutting operations can be started anywhere an access

Buckeye Portable Air-Powered Nibbler



A message to industry from one of America's large users of "Coolants"

"We put Lusol on our toughest jobs. One in particular was an axle, heat-treated prior to machining to 35-40 Rockwell. Before we tried Lusol, we were lucky to get around the axle with one tap. Now we get 8 to 10 axles with one tap.

"On another job we were machining a $\frac{3}{8}$ " cut, and the chips came off blue. Smoke was everywhere. We put Lusol in this machine, increased our cut to $\frac{1}{2}$ ", increased the speed and cut without heat or color.

"We use Lusol in turret lathes, radial and upright drills, and on all turning jobs. We use it in gearboxes in automatic bar machines as both lubricant and coolant.

"All the fellows like Lusol. It's got a clean, fresh smell. No chapped hands or infection, either. And, clothes stay clean longer."

WRITE FOR... The illustrated booklet Lusol Gets To The Point, or request that one of our engineers call at your plant. He will explain and demonstrate the uses of LUSOL SUPER CONCENTRATE in your machines. He will show you how to reduce temperatures and obtain the outstanding results claimed for LUSOL by this industrial plant and many others, both large and small. F. E. Anderson Oil Co., Inc., Box 216-J, Portland, Connecticut.

Seattle: F. E. Anderson Co., 3440 E. Marginal Way Salt Lake City: Flinco, Inc., 276 West First Street Denver: Hathaway-McCartney Co., 1459 S. Pearl Street Los Angeles: M. C. Crawford Co., 2521 W. Slauson Avenue



ALL-CHEMICAL METAL WORKING SOLUTION hole is provided in the panel for the tool. According to the manufacturer, the nibbler makes a sharp, clean cut without distorting the exposed edges of the metal. Capable of cutting a radius as small as 1 in., the tool can be used to follow any contour. Available with lever or lock button throttle, the nibbler has hardened and ground anvil and punch, both of which are easily accessible for regrinding or replacement if necessary.

Face Milling Cutter Features Solid-Carbide Replaceable Blades

Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., has announced a solid-carbide inserted-blade face milling cutter which is designed for milling cast iron, malleable iron, brass and similar metals. The cutter incorporates a greater number of solid carbide blades than previous models supplied by the company, thus permitting the use of higher speeds, as well as

faster feeds. The blades are extra heavy, are arranged radially for maximum blade life, and can



Super Solid-Carbide Inserted-Blade Face Milling Cutter

be reversed and used in either right or left-hand bodies. The cutter is available in five standard sizes; namely, 6, 8, 10, 12 and 14 inches. in both right and left-hand types. Special sizes of cutters designed to meet individual requirements can also be supplied if desired.





Photos: Courtesy Spanich Bonding & Welding Co., Livonia, Michigan

The "Hot Shot" Bonding machine shown above was specially designed

for the production department of one of the largest manufacturers of electrical appliances when previous methods of processing their parts proved unsuccessful. The positive clamping action of eight Model 340 De•Sta•Co Heavy Duty Toggle Clamps now enables one operator to produce 3840 completed brakeshoes per 8-hour work day. Fast acting De•Sta•Co clamps hold parts firmly together during the 550° F. bonding operation.

There's a De-Sta-Co Toggle Clamp engineered for any of your work-holding problems in assembly, bonding, welding, machining or inspection. Select from over 40 fixture and portable models. Positive holding pressures up to 4,000 pounds. Write today for a copy of the De-Sta-Co catalog describing available stationary and portable toggle clamps.







(Left) Traub Turning and Copying Automatic. (Right) Leinen Model SR-26-RG Turret Lathe

Turning and Copying Automatic and Two-Turret Lathe

Guthery Machine Tool Corp., 130 W. 42nd St., New York 36, N. Y., is now marketing the Traub Turning and Copying Automatic with Swiss-type guide bushing support and the Leinen Model SR-26-RG Turret Lathe with two turrets. The automatic incorporates a headstock which is stationary

and cannot slide axially; a guide bushing which is not stationary and can move axially; front and rear slides, controlled from independent flat cams, which can move both radially and axially during the operating cycle; and vertical slides, controlled from independent flat cams, which can move both radially and axially during the operating cycle. The machine is pro-

solve heat-treat problems

with versatile Temco benchtype furnace



Step up production, cut costs with Temco electric furnaces for heat treating dies, parts, tools, etc. Model illustrated above one of eight convenient sizes available with either electronic or manual temperature controls. Economical, easy



THERMO ELECTRIC MANUFACTURING CO.

to install and operate, low cost. Priced from \$55.00 to \$507.50. Write for literature and nearest dealer's name.

488 HUFF ST., DUBUQUE, IOWA

vided with a copying-template holder on which a template may be mounted and which may be controlled by the rear slide.

The turret lathe incorporates an eight position turret in the rear which moves crosswise, lengthwise and at angles; automatic longitudinal power feed; four position turret in front which drills, centers, reams, taps, and so on; automatic bar feed; built-in coolant system with chip separator;

and reversible stepless P.I.V. drive. The machine is said to have a maximum collet capacity of 1-1/32 in., maximum turning length of 4-5/16 in., and maximum chucking diameter of 2-5/32 inches.

Cut-Off Blade Is Made of Special Cast Steel Alloy

Designated as Amcam X, a cut-off blade which is made from a special

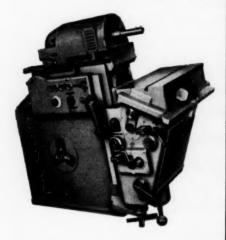
cast steel alloy, including tungsten, chromium, cobalt, carbide and other metals which produce an unusually high red hardness, has been announced by American Cam Co., Hartford 1, Connecticut.

According to the manufacturer, the alloy permits the use of high speeds and feeds on automatic screw machines that are used in cutting high carbon, chrome, stainless steel and other alloy steel, as well as brass, copper, cast iron. and so on. Initial hardness of the alloy is said to be maintained at 60-63 Rockwell C and is not affected by heat generated in machining. The blade is available in various sizes. to fit standard type holders.



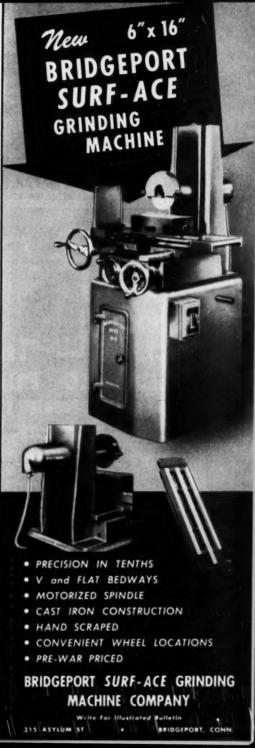
Boring Machine Produces Both Small and Large Runs Without Complicated Fixtures

Morey Machinery Co., Inc., 383 Lafayette St., New York 3, N. Y., has announced the Alfing Model HFS O/K 250 Universal Fine Boring Machine which is said to produce both small and large runs without complicated fixtures. This is accomplished by the arrangement of the work table with optical settings. The height of the knee and the cross adjustment of the



Alfing Model HFS O/K 250 Universal Fine Boring Machine

table are combined with an optical reading device for setting the machine accurately. The feed movement of the headstock slide and the longitudinal traverse of the cross slide are controlled vertically. The feed of the headstock slide is infinitely variable from 0.236 to 12 in. per minute. The quick return movement, which is released upon completion of each working stroke by hand, takes place at a speed of 114 in. per minute. The actual hydraulic feed values, with regard to the headstock slide and the cross slide, can be read accurately from a feed in-



dicator especially provided for this

purpose.

The spindle speed of the headstock is said to be infinitely variable from approximately 300 to 3,000 r.p.m. by means of a set incorporated into the body of the machine. The height adjustment of the work table is performed by means of the vertically adjusted knee. Coarse adjustments are effected mechanically through a gear driving motor, and fine adjustments are

made by a laterally arranged handwheel, one turn of which is said to result in a height adjustment of 0.0047 inch.

Stainless Steel Height Gage Has Chrome-Plated Graduations

Foster Supplies Co., 6122 Milwaukee Ave., Chicago 30, Ill., has announced a stainless steel height gage with chrome-plated graduations which

stand out clearly against the dull chrome background. The gage incorporates a completely hard-



Foster Chrome-Plated Height Gage

ened beam and a large 1.225-inch adjustable type of vernier which is also made of chrome - plated stainless steel.

According to the manufacturer, the long slide, large base, and heavy be am of the height gage ensure maximum accuracy and dependable stability. The height gage is available in sizes of 12, 14, 18, 24, 36 and 48 inches.

SAVE 3 WAYS WITH A LUCIFER ELECTRIC FURNACE

SAVE with a Lucifer Electric Furnace on FIRST COST. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace EVERY TIME.

- 2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed—Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECI-FIED temperature without variation. No special experience required when you use a Lucifer Furnace.
- 3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

CHECK THESE PRICES

Furnace Size	2000'	2300'
6x 6x12"	\$467.00	\$548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
18x18x36"	1419.75	1629.50

Complete with 100% automatic electronic controls.

WRITE FOR FREE LITERATURE, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or 'phone today.

LUCIFER FURNACES, INC.

Successors to Gilbert S. Simonski Company
Neshaminy 10, Pa. Phone Osborne 5-0411

Surface Grinder Is Designed for Gage and Form Tool Work

Designated as the No. 10, a precision surface grinder which is designed for gage and form tool work, as well as surface grinding, has been introduced by Covel Mfg. Co., Benton Harbor, Mich. The grinder utilizes a reciprocating table and is available with hand or mechanical feed. Longitudinal table travel is 20 in., transverse table



Covel No. 10 Surface Grinder

travel is 7 in., and vertical table travel of the grinding wheel is 15 inches. The machine will grind work measuring 6 x 18 x 15 in. high under a 7-in. grinding wheel which is driven by a 1-h.p. motor-driven spindle. The table speed ranges from 15 to 50 ft. per minute. A special 1/6 h.p. 1,200-r.p.m. reversing motor drives the table through variable speed pulleys.

For very close work, such as gage grinding, the elevating and transverse movements can be equipped with indicator gages for use with gage blocks

Buy



PRESS ROOM EQUIPMENT

STANDARD STOCK STRAIGHTENERS

Made in nine standard sizes to meet most requirements. Widths from 2" to 8"; roll combinations range from 5 to 9. Special sizes available to specific requirements.



SLIDE FEEDS

For automatic presses, 7 sizes to meet most jobs. Check roller release for faster set-up — has improved one way clutch. Adjustable feed blade with carbide tip. Double feed black stops are nonfouling and easily set.



AUTOMATIC STOCK REEL

Operates by natural spring of uncoiling stock. Platen turns on ball bearings. No motor, belts or sprockets. Loop of stock stops slippage, kick back, and over run. Speed limits controlled only by feed.

Write Now for new catalog showing prices and complete line of Equipment.



DURANT Tool Supply Co.

136 SOUTH WATER STREET, PROVIDENCE 3, R. I.

or measuring rods. Other attachments available are hard chrome table ways, wet attachment, magnetic chuck, dust collector and Bijur lubricating system.

Portable Band Saw Cuts Straight or Angles to 45 Degrees

Designated as the "Mighty Midget" Model 53-B, a portable metal cutting band saw which is designed to cut

CAMS

MADE TO YOUR SPECIFICATIONS

Except Screw Machine Cams —
 Design Assistance Offered

BLOOMFIELD TOOL CORPORATION
37 Farrand St. Bloomfield, N. J.

SAVAGE NIBBLING MACHINES



CAPACITIES UP TO

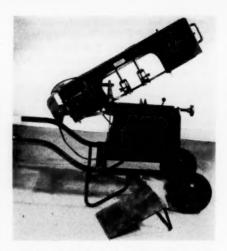
ASK FOR FREE BULLETIN

"NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING AND FAST AND ACCURATE CUTTING OF FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE

W. J. SAVAGE COMPANY
Knoxville Since 1885 Tennessee

PIONEER MFRS. OF NIBBLING MACHINES



"Mighty Midget" Metal Cutting Band Saw

straight or angles to 45 degrees has been announced by McCarty Machinery Sales, Bayfield, Wis. The machine has a 6 in. throat and a 9 in. guide clearance. The machine is also capable of converting into a vertical table saw by raising the saw to a vertical position and clamping a table in the vise.

The unit incorporates a ¼-h.p. motor with a belt drive, providing speeds of 65, 130 and 250 ft. per minute. The machine measures 41 x 17 in. overall without the truck. Overall dimensions with the truck are 19¼ x 50 inches.



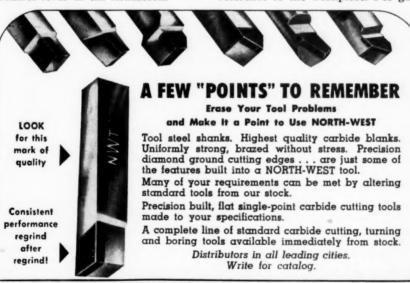
Machine Generates Internal or External Threads up to 4 Inches in Diameter

The Lees-Bradner Co., Cleveland 11. Ohio, has announced the Sentinel Cri-Dan B Single Point Threading Machine which is said to be capable of generating external, internal, right or lefthand, tapered, multi-start, triangular, square, buttress, trapezoidal, round or special threads up to 4 in. in diameter, external and internal. Ample power is provided by a 5-h.p. 1.800-r.p.m. motor which is mounted outside the machine for ease of maintenance and adequate ventilation. Work spindle speeds from 145 to 2,800 r.p.m. in 24 steps can be obtained by means of a sliding gear, quick change, headstock drive transmission. Change gears provide the ratio required to control the slide movement for various leads or pitches. Left - hand threads are generated by means of a control lever in the headstock.



Sentinel Cri-Dan B Single-Point Threading

According to the manufacturer, smooth, free-sliding movement of the saddle and tailstock is assured by separate vee and flat ways. Gears and headstock are lubricated with oil circulated by a gear pump incorporated in the drive. A rack and pinion position the apron longitudinally with reference to the workpiece. For gag-



THE NORTH-WEST TOOL COMPANY

8 North Kilmer St. Dayton 7, Ohio ing purposes, a quick-acting clamp and an adjustable, positive stop are provided.

Immersion-Type Pump Handles Coolants Contaminated with Abrasives

Associated Engineers, Inc., P. O. Box 1628, Springfield, Mass., has announced the PresSureKool ImmersionType Pump which is interchangeable with immersion - type centrifugal pumps and which is especially designed for pumping coolants contaminated with abrasives. According to the manufacturer, the pump is ideally suited for replacement purposes where pressure furnished by centrifugal pumps is inadequate. Manufactured to J.I.C. standards, the pump is said to be capable of pumping coolants in the vary-

ing viscosities of a 11 commercial coolants and can be used on lathes. grinders, millers, automatic screw machines, planers, and other types of



With Single Cutting Edge REVOLUTIONARY.....CHATTERLESS!

Greater ease in cutting is the outstanding feature of these new cutting tools-made for 82° angle countersinking and for 90° angle deburring operations. Have only a single cutting edge which prevents chatter. Both tools are regularly made for right hand cut. One trial will convince you. Special tools of this type made to order.

Write for further details

Weldon Distributors throughout U.S.A. and Canada carry complete stocks to serve you.





PresSureKool Immersion-Type Pump

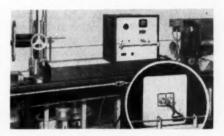
machines. The pedestal of the pump is 234 inches in diameter, and the unit is available in heights of 10 and 12 inches.

Heating Unit Bonds Individual Strands of Multi-Strand Wire

Designated as the Model T-1-W. a tube-operated induction heating unit which is designed to bond together the individual strands of multi-strand wire and cable, thereby preventing the ends from becoming frayed or loose, has been announced by Lepel High Frequency Laboratories, Inc., 55th St. & 37th Ave., Woodside 77, New York City, N. Y. When used in conjunction with an automatic wire cutting and stripping machine, the wire is fed continuously through the load coil of the generator, and the heating cycle is synchronized with the stroke of the wire cutter. The wire is heated and bonded at successive points where the subsequent cutting and stripping operations occur.

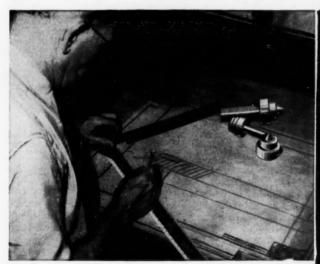
The unit operates on single-phase 115-volt current and contains a step-

less power control to easily select the proper output for heating various types of wire products. According to



Lepel Model T-1-W Portable Induction Heating Unit in use. (Inset) Close-up view of coil arrangement of the unit

the manufacturer, the unit is also ideally suited for heat treating thin parts, such as surgical needles, dental burrs, localized annealing of spring wire and joining of wire products.



Engineered Live Centers . A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.



Dust Collectors Have Extra Large Dust Drawers

Torit Mfg. Co., 296 Walnut St., St. Paul 2, Minn., has announced the 602A Series of three cabinet type dust collectors equipped with extra large dust drawers. Each collector is built into a cabinet 28 in. square x 66 in. high, with dust drawers having a 7 cu. ft. capacity. However, air capacities range from 300 to 11 c.f.m., depend-

ing upon the power plant. The largest unit in the series is the Model No. 84 which is powered by a 3-h.p. motor and which develops 1,100 c.f.m. with one 6-in. inlet or 525 c.f.m. from each of two 4-in. inlets. The collector is intended for heavy, continuous service with several small grinders and polishers, or with one or two extra large machines.

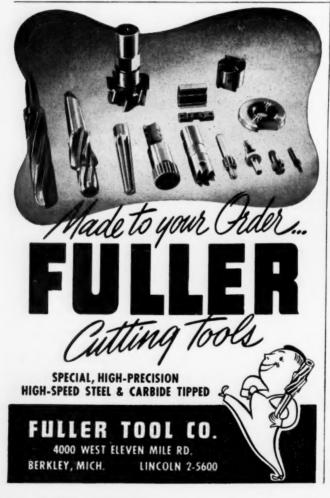
For lighter service, but still capable

of long, uninterrupted duty, are the Models 80 and 81. The Model 80 is powered with a 1-h.p. motor and



Torit Model 84 Dust Collector in Series 602A Cabinet

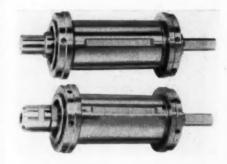
develops 300 c.f.m. from each of two 4-in. inlets or 650 c.f.m. from one 6-in. inlet. The Model 81 is powered with a 1½-h.p. motor and develops from 465 to 1,000 c.f.m., depending upon the size and number of the inlets.



Spindle Assemblies Simplify Designing of Special Machines

A line of mass-produced standard spindle assemblies which are designed to simplify the designing and manufacture of special machinery has been announced by Russell T. Gilman, Inc., 2410 N. Farwell Ave., Milwaukee 11. Wis. The assemblies, it is claimed. can be easily designed into any special machine where their range is suitable. Drills, reamers, taps, end mills and other tools of similar size can be accommodated. Spindle sockets are furnished for either a No. 0 or No. 1 Morse taper shank, or 1/8, 3/16, or 1/4in, maximum capacity collets. Overall dimensions of the spindle assemblies range from 4% to 8 in. long and from 1% to 21/2 in. in diameter.

Longitudinal (in and out) adjustment of the spindle with relation to its mounting surface is provided by means of nuts at either end of the quill housing. Single row ball bearings at either end of the assembly are standard, but double row bearings



Gilman Morse Taper (top) and Collet-Type (bottom) Spindle Assemblies

can be furnished if desired. A keyway is machined in the quill housing for locking it in the casting where the spindle assembly is to be mounted.

For Unvarying ACCURACY... Standardize on ECONOMY "TRU-LOC" **Adjustable Adapters** & Nut Economy ✓ CONCENTRIC "TRU-LOC" Adapter GROUND ACME THREADED BODY Sleeves "TRU-LOC" NUT - Lock in Any A.S.A. Drill Jig Bushings Position A.G.D. Plug & Ring ✓ WOODRUFF KEYWAY — Relieved. Gages All items in stock - immediate delivery assured. Write for latest Bulletin and Price List. conomi

Milwaukee 14. Wis.

Magazine Attachment for Screw Machines

The Alco Tool Co., 152 Birdseye St., Bridgeport 4, Conn., has announced a



Alco Magazine Attachment

magazine attachment for B & S automatic screw machines which is said to permit second operations to be per-

formed semi-automatically. The magazine consists of a complete setup, including the magazine for holding and carrying work to the chuck; cams; form tools; and a chuck complete with an ejector and an inserting tool.

According to the manufacturer, no extra drilling or fitting is necessary when attaching the magazine as it is mounted on the front cross slide of the machine. Parts can be automatically ejected and dropped into a work pan when completed.

Backstand Idler Is Designed for Heavy-Duty and Light Polishing

The "61" Universal Backstand Idler, a low cost attachment for all types of wall, bench and floor coated-abrasive backstand grinding and polishing operations has been announced by the Coated Products Division of The Carborundum Co., Dept. MM, Niagara Falls, N. Y. Designed for heavy-duty

IF You bend thin-walled tubing THEN

you can prevent wrinkling and make perfect bends to smallest radius, by the Cerrobend Method. Save time and money by filling tubes with Cerrobend, the expanding metal that melts in hot water. Then bend the tubes like solid rods. After bending, melt out the Cerrobend in hot water. It can be reused indefinitely.

Write for Data Sheet H3.



Paris Materials Experition International Amphitheatra Chicago

See our exhibit at Second Basic Materials Exposition, International Amphitheatre, Chicago, Illinois, May 17 - 20, Booth 318.

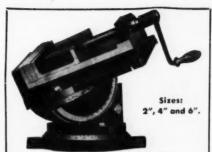
production grinding, as well as for intermittent light polishing jobs which call for frequent setup changes, the idler is said to permit belts of the same length to be employed with contact wheels of various diameters. Varying widths of belts can be used, ranging from ½ to 8 in., due to a belt tracking mechanism and highly sensitive tension adjustments. The tracking device, it is claimed, eliminates the need for precise center alignment between idler pulley and contact wheel,



Carborundum "61" Universal Backstand Idler

thus minimizing downtime during contact wheel change-overs. A linkage-type arrangement permits finger-tip manual adjustment of tension and tracking.

The idler is available in two models; namely, the Model 432 for floorstand operations and the Model 431, a smaller, more compact unit for floor, wall or bench installation. Each model is supplied as an individual unit or as part of a complete packaged backstand installation which is furnished complete with a specially serrated "T61" contact wheel.



MAKE SET-UPS FASTER--

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

Write for Circular

DONOVAN MFG. CO.

80 BATTERYMARCH ST., BOSTON 10, MASS.

CLIPPER PRECISION DIAMOND TOOLS

Industrial Diamonds
Thread Grinders
Turning Tools
Engraving Tools
Dressing Tools
Diamond Pawder

Manufacturers of DIAMOND WHEELS

and Hones of highest quality. Prompt delivery.

Ask for literature.

C C

Representatives in Principal Cities

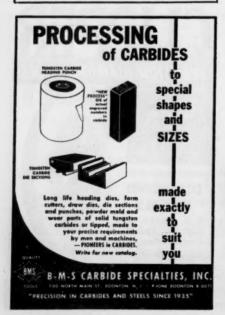
CLIPPER DIAMOND TOOL CO., INC. 21-C W. 46 ST. NY 19



Multiple Nut Setter Provides Individual Torque Control

A multiple nut setter which is designed to set from two to five nuts simultaneously, each to an individual torque, has been announced by Keller Tool Co., Grand Haven, Mich. The setter utilizes four motor units covering a range of from 20 to 120 foot-pounds. Each motor unit has an integral torque regulator which can be easily adjusted over the entire range of the

DRILL THESE HOLES
BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature.
WATTS BROS. TOOL WORKS
Wilmerding, Pa.



motor. Once the regulator is set, the setting is said to be held indefinitely. The motor units are bolted to a spe-



Keller Multiple Nut Setter in use

cially-made mounting plate of ½-inch steel but can be easily removed for conversion to other jobs. Air is transfered from the manifold to the motor units by means of ½-inch steel tubing.

Offset spindles make setting possible when bolts or nuts are closely spaced, and axially-resilient socket adapters are said to enable the nuts or bolt heads to be located easily.

Engraving Machine Features Fabricated Floor Stand

Designated as the Model UE-3F, an engraving machine which has resulted

CAMS

We are fully equipped to **GRIND** OR **MILL** a complete range of CAMS to your specifications on our **ROWBOTTOM** Cam Milling Machines.

Your inquiries answered promptly.

HIMOFF MACHINE CO., INC. 23-16 44th Road Long Island City 1, N. Y. from adding a fabricated floor stand, a handwheel screw work table adjustment and other features to the Model UE-3 "Preis-Panto" Engraving Machine has been announced by H. P. Preis Engraving Machine Co., 188 Industrial Branch, 657 U. S. Route 22, Hillside, N. J. The floor stand is of the open front type with the work table adjustment handwheel immediately in front of the operator. A foot rest is provided for the operator's



"Preis-Panto" Model UE-3F Engraving Machine

comfort, and a 10 x 12-in. shelf is located at each side of the machine for holding tools, cutters and other items. A flexible, adjustable aluminum lamp is also furnished as standard.

The stand measures 30 in, high x 19 in, wide x 19 in, deep. The complete assembly, including the engraving machine, measures $47\frac{1}{2}$ in, high x 23 in, left to right without the shelves. The shelves increase the width to 39 inches.

WHEN YOU
WANT
WASHERS
Save by buying from
WHITEHEAD



by using Whitehead Stock Washer Dies.

1500 SPECIAL SIZE DIES ON HAND.

Whitehead makes washers and shims from any metal or special material to your specifications. Thickness from .002" to 3/8".

In stock: S.A.E. standard light, medium, and heavy steel washers; brass and copper, small and large patterns; bolt sizes. Write for Whitehead's Catalog.

54.4



STAMPING CO.

1673 W. Lafayette Blvd. Detroit 16, Michigan

Fixed Position Plate Accommodates from Two to Eight Spindles

A fixed position plate, an accessory which permits quick, easy conversion of the "Multi-Drill" to a fixed spindle multiple head without eliminating the advantages of full adjustability, has been announced by Commander Mfg. Co., 4224 W. Kinzie, Chicago 24, Ill. From two to eight spindles may be installed in the plate. According to

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill cir-



cles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.

Write for Circular NIELSEN TOOL & DIE COMPANY P. O. Box 1067 Berkley, Mich.



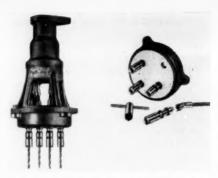
Gone are the days when you had to wait for delivery on most punches and dies while they were made to order. Now they wait for you.

You can order for immediate shipment from our stock, 76 styles of punches and 65 styles of dies in round, flat, oval, and square sizes to fit most makes of presses.

Besides this saving of time, you save money. Send for our catalog sheets and check the lists of immediately available sizes and their prices.

T. W. LEWTHWAITE MACHINE CO.

317 East 47th St., New York 17, N. Y.



Commander "Multi-Drill" and Fixed Position

the manufacturer, the plate can be easily and quickly attached to any Multi-Drill and provides fast, accurate setups of intermittently run repetitive

Initial setup of the plate for a specific job merely requires drilling a hole for each lock-in-position spindle assembly using a layout guide which is provided. Any slight irregularity in drilling the fixed position plate is said to be compensated for when the spindles are installed and locked in position. Minimum hole centers of from ½ to 9 in. are possible with the plate.

Pantograph Engraver Is Adaptable to Conventional Milling

Johnson & Bassett, Inc., 114 Foster St., Worcester, Mass., has announced

A Real Spring Winder!



Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the

ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

No. 1 Capacity 0 thru 3/32" wire \$1.50 No. 2 Capacity 0 thru 3/16" wire \$3.00 No. 3 Capacity 0 thru 5/16" wire \$5.00

HJORTH LATHE & TOOL CO. 10 BEACON STREET

WOBURN, MASS.

a two-dimensional pantograph engraver, designated as the Model 2A Panto-Miller, which is a precision pantograph designed for production engraving, profiling, die cutting, and milling in steel, cast iron, non-ferrous materials and plastics. With the spindle arm locked, the machine is also capable of performing conventional milling operations. Sturdily constructed of stress-relieved Meehanite and equipped with precision ball bearings



Johnson & Bassett Model 2A Panto-Miller

at all critical points, the machine is said to have free arm action and sensitivity. According to the manufacturer, exact settings of pantograph reductions from 1:1 to 1:40 are easily practical. Spindle speeds, controlled by a simple dial, are infinitely variable from 1,200 to 1,500 r.p.m. through a U. S. Varidrive system which requires no belt changing.

The standard copy table of the Panto-Miller measures $10\frac{1}{2} \times 16$ in., and the work table is 10×26 inches. Both tables are provided with T-slots.

QUALITY Depends on ACCURATE INSPECTION



Accuracy of measurement depends on the precision of the measuring tools. Provide your shop and inspection department with dependable and proper inspection tools. MEEHANITE METAL TOOLS, made to close tolerances, are furnished in many types.

Surface Plates — Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels — Lapping Plates
Toolmaker's Knees — "V" Blocks
Straight Edges (Bridge Type)
Straight Edges (Leveling Type)
Measuring Irons
Masterangle Plates
Angle Attachments
Send for Bulletin

ACME TOOL CO.

73 W. Broadway, New York 7, N. Y.

Unit Automatically Cycles Test Parts Through Alternate Hot and Cold Temperatures

Designated as the ST-120-3, an automatic testing chamber which automatically cycles test parts through alternate hot and cold temperatures has been announced by Cincinnati Sub-Zero Products Co., 3930-S3 Reading Rd., Cincinnati 29, Ohio, The unit, which has a test chamber 30 in. long

x 11 in. wide x 16 in. deep, produces broken tools culturs, drivers, the NU-TANG way NO WELDING! NO SLEEVES! NO DISTORTION! NO SHORTENING! GUARANTEED We return them us like this! STRONG AS NEW! like this ANGS INC. 1339 Bates Avenue Cincinnati 25, Ohio



first a low temperature down to a minus 120 deg. F. The unit then raises the temperature to a plus 200 deg.



Sub-Zero ST-120-3 Automatic Testing Chamber

F. and will repeat the cycle as many as 100 times. Holding time at high and low levels is variable by means of a dual-set timer which determines half-cycle time anywhere between 0 and 120 minutes.

To allow the automatic cycling, the test unit is equipped with explosionproof and water-proof strip heaters. rated at 3,500 watts, and the automatic programming controls. Other equipment incorporated in the unit, adding to its utility for all types of instrument, equipment and material tests, includes a 24-hour chart recording thermometer and a 2-in. porthole through which test leads may be run.



Engraving Machine Features Portable Chassis

Designated as the Model I-L, a small engraving machine with a portable chassis which may be lifted off the base, taken anywhere in the plant, and set directly onto the work surface to be engraved has been developed by New Hermes Engraving Machine Corp., 13-19 University Place, New York 3, N. Y. Designed for the engraving of panels, dials, name plates, signs, and similar items, the machine is no larger than a typewriter and is said to be simple to operate. A quick-acting workholder clamps any size panel of steel, plastic, or wood. The machine features an adjustable copy holding slide, whereby an operator can engrave a name plate with several lines simply by adjusting the movable copy holding slide to any spacing desired.

A pantograph arrangement allows the changing of ratios by a simple sliding operation without disassembl-



New Hermes Model I-L Engraving Machine

ing. Fifteen different size letters may be engraved from one master letter. An automatic depth regulator with a micrometer attachment is said to afford uniform depth of cut.



Portable Tool Toter and Tool Chest

Two tool units, designated as the Model 270 Porta-Cab Portable Tool Toter and the Model 106 Tool Chest. have been announced by Huot Mfg. Co., 538 N. Wheeler St., St. Paul 4, Minn. The Model 270 Porta-Cab is shipped knocked down and without drawers; however, the user may add drawers as necessary. The unit, it is claimed, can be set up quickly with only a screw driver, and a unique

IG BORING

Large Precision Machining

Done to your specifications

We Have 13 Jig Borers

BLOOMFIELD TOOL CORPORATION 37 FARRAND ST. BLOOMFIELD, N. J.

CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

WRITE FOR STOCK LIST 1114 E. 87TH ST. CHICAGO 19



(Top) Huot Model 106 Tool Chest. (Bottom) Huot Model 270 Porta-Cab Portable Tool Toter

three-way construction makes the unit rigid. Each shelf is bolted in three different directions. "Flying saucer" type casters are available as optional equipment. The unit measures 27 x 18 x 321/4 inches overall.

The Model 106 Tool Chest is built with interlocking tabs on the "add-adeck" principle and utilizes two drawers. The overall size of the unit is 91/8 x 261/8 x 12 inches, and each of the drawers measures 23/4 x 23 x 103/4 inches.



221 SPRING ST.

Machine Deburrs Both Sides of Holes

Designated as the Model "A," a semi-automatic deburring machine which is designed to remove burrs from both sides of holes at the rate of 600 to 3,000 holes per hour has been announced by Model Machine Co., 4729 Hawthorne St., Philadelphia 24, Pa. Using standard countersink-type deburring tools, the spindles rotate in opposite directions, providing an



Model "A" Deburring Machine

equalized cutting action. The capacity of the machine is 6 in. between chucks and will accommodate up to a 1-in. diameter hole. According to the manufacturer, work-holding fixtures are not necessary as the operator merely inserts the part, depresses a foot-control pedal valve, and the machine automatically starts its cycle, thus leaving the operator's hands free for loading.

The machine is equipped with air controls for infinite cycling and speed control, and the pressure required to operate the machine is from 5 to 40





STANDARD DIMENSION STUB SCREW MACHINE REAMERS

Finished blanks in stock: Sizes No. 00 to No. 23 to grind from .0600" to 1.0100". Tolerances unless otherwise specified plus or minus .0001".



STUB SCREW MACHINE REAMERS

For larger type Gridleys, Chucking Machines, Turret Lathes, and Hand Screw Machines. Also used extensively for second operation work.

Finished blanks in stock to grind from .0930" to 1.2500". Tolerances unless otherwise specified plus or minus .0001".



SPECIALS MADE TO ORDER PROMPTLY



Backed by 27 years of manufacturing experience on reamers exclusively, we also make Die Clearance Reamers, Helical Taper Pin Reamers, Carbide Tip Reamers, and Special Reamers to your blue print specifications and requirements.

Write for bulletin giving full details.

MANUFACTURERS' AGENTS: A few exclusive territories still open. Write us.

THE BUOL MACHINE CO.
MEADOW & PARK STREETS
NEW BRITAIN, CONNECTICUT

lb. with minimum air consumption. The machine is driven by a 1/3 h.p., 115-120 volt, single phase, capacitator motor, equipped with a variable speed drive.

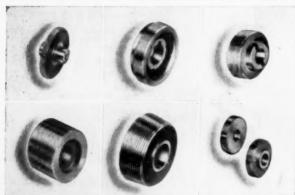
Cutter Grinder Is Always Operated from the Front

Clarkson, Inc., 320 Ontario St., Toledo, Ohio, has announced a cutter grinder which is always operated from the front, placing the work in easy view of the operator. According to the manufacturer, cutters can be set and completely sharpened in from 15 to 25 minutes, according to the type of cutter. Powered by a ½-h.p. motor, the grinder utilizes a lamp which is adjustable at any angle for providing concentrated illumination of the work. Equipment can be supplied to permit all straight and Morse taper shank cutters to be sharpened, as well as all

size side and face cutters up to 6 inches in diameter and with up to 1¼-inch diameter center holes.

Thread Rolls

on automatic screw machines and turret lathes





produce uniform, accurate threads economically

Reed makes special thread rolls of all kinds. Send us samples or detailed specifications of both roll and thread to be produced.

REED ROLLED THREAD DIE CO.

Thread Rolling Machines and Dies, Thread Rolling Attachments,
Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes
WORCESTER, MASSACHUSETTS, U. S. A.



Clarkson Cutter Grinder

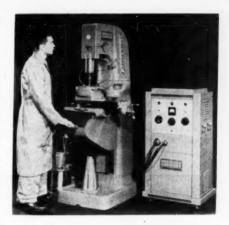
The machine is said to be ideal for sharpening end mills, slot drills, reamers, Woodruff cutters, side and face cutters, cylindrical cutters, face mills, angle cutters, and hollow mills.

Ultrasonic High Precision Machine Cuts Unusually Hard Materials

The Sheffield Corp., Dayton 1, Ohio, has announced the newly-designed "Trail Blazer" Cavitron Ultrasonic High Precision Machine Tool which is said to have the ability to machine socalled "un-machinable" materials and which possesses all the elements required for accuracy, versatility and simplicity of operation. According to the manufacturer, the machine can accurately produce holes as small as 0.012 in, in diameter or slots of that width, in the hardest materials, at unusual speed.

The precision machine, it is claimed, will sink blind, through, tapered or curved holes of almost any desired shape and depth; engrave or type matrix dies: cut keyways and oil holes: machine serrated root forms of iet turbine blades: and perform countless other operations.

The machine utilizes an inexpensive



Sheffield "Trail Blazer" Cavitron Ultrasonic High Precision Machine Tool

tool (such as soft steel) for the precision cutting of hard or brittle materials, either ferrous or non-ferrous, including those which are non-magne-

for Every Need!



9 Block Set \$22.50 OPTICAL PARALLEL \$5.00 Supplied in one Superior Accuracy

5 MILLIONTHS ± ACCURACY



Small Standard Sets

Quick Delivery on

34 Block Set \$125.00 INCLUDING OPTICAL PARALLEL

All Sets at "Money Saving Prices" due to Mass **Production Methods.**



82 Block Set \$275.00 Complete

This Set will supply the needs of any discriminating shop that must work to gage-block precision.

Dealers: Here's a real profitable line!

WRITE FOR FULLY ILLUSTRATED CATALOG

200 -MM LAFAYETTE ST. . N.Y. 12, N.Y.



tic and non-conductors of electricity. The operation is accomplished by the use of an ultrasonic tool head vibrating from 18,000 to 30,000 cycles per second while a pump provides a continuous flow of abrasive grit in solution over the work surface. It is claimed that extremely fine finishes are obtained, and there is no local heating or electrical burning of the work or chemical or physical change in the workpiece.

Dust Collector Is Reverse Jet Fabric Unit

American Air Filter Co., Inc., Louisville 8, Ky., has announced the AMERjet Dust Collector which is a reverse jet fabric collector designed for those applications where extremely fine particles are involved or where the material must be collected in a dry state for reclaiming. The cleaning medium is said to be automatically reconditioned by a jet of high pres-

sure air forced through the cloth in the opposite direction to the flow of the air being cleaned. The unit



AMERjet Dust Collector

is claimed to maintain a constant pressure drop, providing a steady air volume at the exhaust points.

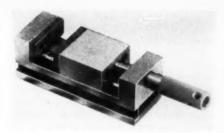
The method of media reconditioning used is also saidtopermit high velocities through the cleaning tubes.



Toolmakers Vise Is Precision Ground on All Surfaces

A precision toolmakers vise for jig boring, precision grinding, inspection. and so on, is now being distributed by Air Transport Equipment, Inc., Box 25D, Mineola, N. Y. The vise is said to be precision ground on all surfaces to a non-cumulative square and parallel error of 0.0004 in. per in. A dovetailed slide provides rigidity and parallelism and is adjustable for wear. The hardened and ground jaws can be removed for reconditioning or replacement with special jaws, and the leadscrew is totally enclosed to prevent the entry of grit, dirt and chips. All parts are hardened except the leadscrew which is made of high tensile steel. A groove all around the base provides a ready means for clamping.

The vise is available in three sizes; namely, the No. 1 which has a 1-in. jaw opening and jaws measuring 1-1/14 in. wide x 7/16 in. deep; the No.



Precision Toolmakers Vise

2 with a jaw opening of $1\frac{1}{2}$ in. and jaws measuring $1\frac{1}{8}$ in. wide x 11/16 in. deep; and the No. 3 with a 2-in. jaw opening and jaws measuring $2\frac{1}{2}$ in. wide x 15/16 in. deep.

Titanium Bolt Is Available in Six Types

A lightweight high-strength titanium bolt, primarily for use in airframe and aircraft engines, has been



developed by Standard Pressed Steel Co., Jenkintown 22, Pa. The manufacturer states that the bolt is also ideal for use in other industries, as well as in the construction of aircraft, because of titanium's high corrosion resistance and light weight. The bolt is available in six types; namely, two lines of flush head shear bolts, two lines of internal wrenching tension bolts, a line of external hexagon shear bolts, and one of

external wrenching tension bolts. The bolt can be supplied in sizes of No. 10 $\frac{1}{4}$ and $\frac{1}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, and $\frac{5}{8}$ inch.

Multiple Drill Head Attachment Is Designed for Production Drilling

A multiple drill head attachment which is designed for production drilling in metal, wood or plastic has

> been announced by Silver-King Corp., Aurora, Ill. The attachment provides for an infinite number of



the efficiency, economy and dependability of Wells Heavy-Duty Cut-Off Saws

SEARCHING for a way to reduce metal cut-off costs? Here's an answer—the Wells No. 12 Saw. It's a heavy duty, hydraulically operated saw with automatic cutting cycle designed to step up production with greater accuracy. Capacity is 12" x 16", rectangular, 123/4" dia., rounds. Ask your Wells Dealer for full information or write direct.



Products by Wells are Practical

METAL CUTTING BAND SAWS WELLS MANUFACTURING CORPORATION

808 TYLER ST. - THREE RIVERS, MICH.



Silver - King Multiple Drill Head Attachment

adjustments on three standard 1/4 in. chucks within 3 to 51/2-in. diameters and requires only three minutes to set up on any 1/2 - in. drill press with 134 to 21/4 -in. quills. Each of the three spindles is equipped with a 14-in. Jacobs chuck and two annular shielded ball bearing mountings.

Automatic Driving Center for Lathes with Front End Driving Mechanisms

Mera Machine & Mfg. Co., 221 Spring St., Elizabeth, N. J., is now marketing the Kosta Type K-3 Automatic Driving Center which is designed for use on lathes with front end driving mechanisms. The center is said to be ideal for mass production of massive components, such as pinion or splined shafts in gear-cutting automatics. According to the manufacturer, longitudinally movable driving bolts counteract any irregularities in the uneven end faces of components, and automatic center control compensates for differences in the center holes, thus ensuring precision turning and milling. Components, it is claimed, can be inserted, removed and rechucked with the machine running. thus affording a minimum of stress for the clutching and shift mechan-



Kosta Type K-3 Automatic Driving Center

isms, and finished turning, copying and milling is possible in one operation without rechucking. There is no driving dog or faceplate.

When the component has been gripped, the center is automatically locked. The center is dynamically compensated for maximum rotation speeds of the work spindle. The face ends of components serving as gripping surfaces can be either straight, sawed, forged and perpendicular with or at an angle with the axis of rotation.

Designed for TOOL ROOM EFFICIENCY



HUPPERT Heat Treating FURNACES Range: 300° F. to 2000° F.

Years of satisfactory operation in tool, die and machine shops, as well as laboratories have proven these furnaces to be ideal for production work. Huppert special features include High Temperature, Heavy Duty Kanthal elements—Multi-insulation—counterweighed and tight self-sealing door. Pilot lights indicate furnace operation. All connections factory installed, shipped ready for operation.

Model No.	Inside Dimensions				Prices 220 volt single phase	
	Wide	High	Deep	KW	with Huppert input controller	with electronic temperature controller
869	8"	6"	9"	4	\$280.00	\$480.00
11	8"	6"	12"	4	287.00	487.00
12*	8"	8"	12"	6	367.00	567.00
12A*	8"	8"	18"	0	471.00	671.00

*For 2300° F. add \$95.00 to No. 12 and \$105.00 to No. 12A. No. 12A can be furnished for 3 phase at no additional cost. For floor model add \$50.00 to above prices.

K. H. HUPPERT CO. -

6841 Cottage Grove Avenue

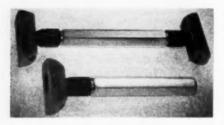
Chicago 37, Illinois

Manufacturers of Electric Furnaces and Ovens

*Write for literature on complete line of furnaces and ovens.

Bore Gage Is Fully Adjustable

Madison Mfg. Co., Muskegon, Mich., has announced the "Boregage" which is said to be fully adjustable and is



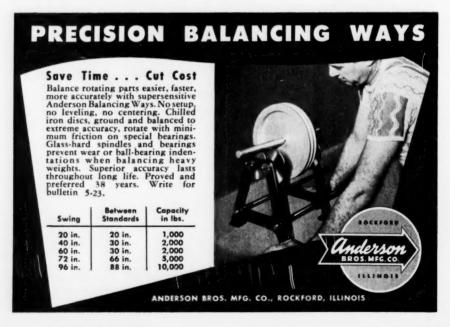
Madison "Boregages"

claimed to provide both the "job shop" and the "occasional user" with an accurate checking device that can be used for checking quantity production accurately. The gage is available in seven types covering a range of bores from 1.432 to 3.192-in, diameters. Ac-

cording to the manufacturer, there is no need for wear allowance as the gage sets to the exact tolerance. After setting, the adjusting and lock screws are sealed with sealing wax. There are no moving parts to wear, and dropping the gage, it is claimed, will not injure it. Also, accuracy is said to be unaffected by coolant.

Vibration Dampener Is Designed for Portable Grinders

Designed for use with raised hub disc wheels, abrasive discs and cup wheels, a vibration dampener for portable air or electric right-angle head grinders has been announced by J & H Products Co., 3007 Elm St., Dallas 1, Texas. According to the manufacturer, the dampener breaks the solid connection between the grinder and the grinding wheel or disc and reduces operator fatigue by taking the





J & H Model H-2 Vibration Dampener

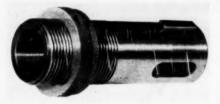
bounce and torque out of the grinder, both of which are absorbed in the dampener. The unit is said to produce an oscillating action which retards loading and heating, and abraded particles are thrown outward from the work.

The dampener is available in two types; namely, the Model H-1 for 7-in. raised hub disc wheels and coated abrasive discs and the Model H-2 for use with 9-in. raised hub disc wheels, cup wheels, and wire brushes.

Adaptor Assembly Provides Accuracy in Drilling Operations

Designated as the "Tru-Loc," an interchangeable adjustable adaptor and nut which is said to assure unvarying accuracy in production when used with multiple spindles for drilling operations has been announced by Economy Tool & Machine Co., 1827 S. 68th St., Milwaukee 14, Wis. According to the manufacturer, the adjustable adaptor assembly is manufactured to comply with precision accuracy and meets standard specifications.

Economy "Tru-Loc" Adjustable Adaptor
Assembly





	TRIA			
TWO	FOUR	OZ.	TUBES	\$1.00
				_

Send me my order of CMD right away!
Bill me Bill my company

Name____

Company Name______

Chicago Manufacturing and Distributing Co.
1910 West 46th St., Chicago 9, Illinois

CHICAGO MANUFACTURING

Toolholder Has One-Piece Barrel

Identified as the Wej-Lok, a tool-holder which has a one-piece holder barrel, accurately machined not only to hold cutting tools but also several holder parts that prevent the tools from turning or coming out once they are locked in place, has been announced by Detroit Reamer & Tool Co., 2830 E. Seven Mile Rd., Detroit 34, Mich. A rectangular wedge is located in the head portion of the holder where

it is moved back and forth in its channel by a retainer to either lock or unlock inserted tools. In locked position, the flat surface of the wedge is firmly seated in the mating notched section on the shank on the inserted tool. Normal torque of the tool in operation is said to tend to tighten the wedging action. A locking ring prevents the retainer ring from turning loose due to vibration.

A slot in the face of the holder per-

mits the use of Baker drive on larger tools or where unusually heavy cutting operations are em-



Cool, expanded air and light weight provides easy handling. High rpm permits use of small diameter wheels—savings in wheel costs. Grease packed for life bearings—provide minimum of maintenance. For the toolroom, dieroom and assembly line.

ONSRUD MACHINE WORKS INC, 3924 Palmer Street Illinois write for Bulletin 1129









Exploded view of Detroit Wej-Lok Toolholder

ployed. By augmenting the wedge locking of tools with the Baker drive, torque stresses are distributed over the larger diameter of the holder face. Both left and right-hand cutting tools can be used in the holder.

Air-Electronic Gage Measures and Marks Inside Diameters

Designated as the Model 144 B-27, a gage which combines air with electronics to measure and mark the i.d. of cylinder block bores, castings, housings, plates, motor blocks, and so on, has been announced by Federal Products Corp., 1142 Eddy St., Providence 1, R. I. The gage, it is claimed, combines the accuracy and stability of the Federal Dimensionair for internal



Illustration showing Federal Model 144 B-27 Air-Electric Gage being used in measuring and marking inside diameter of refrigerator cylinder block

measurements with the sensitivity and versatility of the Model 130 Electronic Gaging Unit. For those workpieces which are suitable, the gage can be designed for automatic feed and disposal, and any number of air plugs can be used for gaging various inside diameters. In addition to checking inside diameters, the gage can also be used to find out-of-round, taper, bellmouth, hourglass, and similar hole defects.

Because each workpiece is marked with a permanent stamp, the corres-

SKINNER precision POWER CHUCKS



"with power to push production"

Available from 6" to 24" with forged steel bodies, and with 2 or 3 adjustable, non-adjustable or serrated jaws. Double-acting rotating and non-rotating air cylinders available for all chuck sizes and for actuating all types of holding fixtures and tailstocks.

Write for catalog describing the complete line of Skinner power and manually operated chucks and accessories. Ask for movie "Chucks and Their Uses" for free showings.



THE SKINNER CHUCK COMPANY

210 Edgewood Avenue, New Britain, Conn.

ponding piston or part, also measured by a Federal high-speed electronic gage, immediately fits into the hole.

Improved Height Gage Measures Close to Plane of Surface

George Scherr Co., 200-MM, Lafayette St., New York 12, N. Y., has announced an improvement in its height gage that consists of a base slotted in front to allow the short solid jaw with a straight scribing point to reach down to the surface plate used; thus marking and reading can start from the bottom with the vernier scale set to zero, resulting in increased accuracy and considerable saving in time. Another improvement is the radical change in vernier reading. A vernier measuring 2.450 inches long and divided into 50 lines, extends over 49 graduations of 0.050 inch each on the main scale, making the difference in

division of the vernier and main scale large enough to read 1/1000 inch with the naked eve.





for greater Production Economy

From start to finish, NEWCOMER CARBIDES are made in our own plant...to high controlled-quality standards.

NEWCOMER CARBIDES are made to give you greater production economy through heavier feeds, faster cutting speeds and greater wear resistance than most other carbides. Complete stocks of standard carbide blanks, cutting tools and mechanically held tools are available for ready delivery.

For your particular cutting problem, consult a Newcomer Tool Engineer . . . there's one located near you.



NEWCOMER PRODUCTS, INC.

LATROBE, PENNSYLVANIA

General Sales Office: 512 Franklin Ave., Pittsburgh 21, Po.



Scherr Improved Height Gage

An open slide permits view of the entire scale. The gage is available in sizes of 10, 20, and 40-inch measuring capacities. A universal test indicator can readily be attached to the gage for reading in tenths or 0.0005 inch.

Safety Clutch Requires Simultaneous Motion of Both Hands

Designated as the Tele-Trol, an electronic two-handed safety clutch designed for use on all devices requiring single trip or single cycle control has been announced by Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif. With the unit, machines cannot be tripped in any fashion except by simultaneous motion of both hands which sends a single



Benchmaster Punch Press equipped with Tele-Trol Safety Clutch

electrical pulse to the solenoid. All operator hazards are eliminated since controls are located out of danger areas.

The Tele-Trol, it is claimed, can convert any mechanical clutch to electric solenoid actuation. Installation requires only the drilling and tapping of two holes. Wiring is complete, and plug-in connections are furnished by which several variations are possible in operation. Accessories are available for converting the mechanism into one hand, knee, foot or remote control.

The LINLEY JIG BORER

Put your small jig boring jobs on this precision machine

Here's a machine, available at extremely low cost, that will enable you to save your larger machines for larger, heavier work. You'll find it meets your most exacting requirements for precision. Get our accuracy information and you'll see what an outstanding investment this machine represents.

Table movement: 6" x 10"; table size, 7" x 171/2". T

Send TODAY for complete information.

LINLEY BROTHERS CO.
661 STATE ST. EXT., BRIDGEPORT 1, CONN.

MUMMERT-DIXON FACING HEADS

Two-way tool feed in 9, 12, 16, 20, 24, 30, 36, 40 and 46 sizes.

One-way tool feed in 6, 9 and 12 sizes. Automatic feed — convenient tool adjustment — quick feed raverse. Save time and costly setups.

Write for folder.



MUMMERT-DIXON CO.

Level Features Ground Vial of 10-Second Accuracy

For accurate setting, erecting and testing of machinery and surface plates, The Lufkin Rule Co., Saginaw, Mich., has announced the No. 59 Mas-



Lufkin No. 59 Master Precision Level

ter Precision Level which features a ground and graduated vial of 10-second accuracy, with one division equaling 0.0005 in. per ft. The level incorporates a special alloy base which is not readily affected by temperature changes and a top plate which is made of special non-conductive insulating material. Extra sensitive screws, having 64 threads per inch, provide fine, positive adjustments. An auxiliary

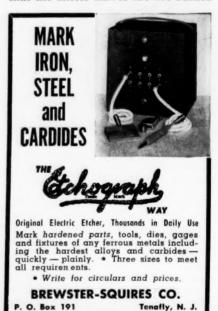
level clearly shows the lateral position.

The unit is made from thoroughly seasoned castings, designed to give maximum protection to the vials. Machined surfaces are scraped, and non-machined surfaces are finished with a black crackle finish. The level measures 15 in. long x 3 in. high and $1\frac{1}{2}$ in. wide, weighs approximately 6 lb., and is supplied in a wooden box with a hinged cover.

Machine Grinds Top and Bottom Slitter Knives

Hanchett Mfg. Co., Big Rapids, Mich., has developed a grinder, designated as the Model SK-24, which is designed for grinding top and bottom slitter knives, as well as all types of circular knives. The grinder is said to permit grinding slitter knives to precision tolerances, both for concentricity and micro-inch finish. To ensure that the slitter knives are not burned





in the grinding, the machine operates on the wet grinding principle, using ample coolant applied directly at the point of wheel contact. The grinding wheel assembly support has a rigid column type of mounting for vertical adjustment to all knife thicknesses. Cross slide movement and screw adjustments are positive and accurate. Automatic oscillation of the grinding wheel is said to afford accuracy and fine finishes.



Hanchett Model SK-24 Slitter Knife Grinder

Slitter knives are held in a horizontal plane, rigidly supported by a backing plate. The fixture revolves mechanically. Top slitter knives are driven through a hardened pin which fits the hole in the slitter knife. Bottom slitter knives with sleeve to match are mounted as a unit with the adaptor. A large graduated dial adjustment is positive in its positioning for any bevel from 0 to 90 degrees. A stainless steel diamond wheel dresser holder is mounted below the work fixture.



TOOLMAKER'S DRILL CHUCK

Will locate your layout to .0001"—200% saving in time. For vert. mills, radial drills and lathes. Combination of high precision chuck and totally enclosed optical unit. Adjustment for spindle runout. Priced considerably less than you might expect to pay for this unique tool. No. 2 or



unique tool. No. 2 or No. 3 Morse taper ... 0-1/2" capacity.

Write today for literature.

Several territories open for distribution.

BANSBACH MACHINERY CO.

223 N. CICERO AVE.

CHICAGO 44, ILL.



ONE Tool ONE Set Up

...for boring, facing, turning, recessing, undercutting.

MASTERHEAD

THE BORING AND FACING HEAD THAT
THINKS FOR ITSELF

Featuring: automatic feeds, end release and return; adjustable stop; adaptable to all standard machines; highest precision; ideal for jig borers; nine models for work up to 36½" diameter.

Send for Illustrated Literature

KARL A. NEISE

404 4th Ave., Dept. MMS, New York 16, N.Y.

Microscope Attachment Provides Long Working Distance and Erect Image

A microscope attachment which provides a 12.8 mm. working distance and an upright image has been announced by Edmund Scientific Corp., Barrington 3, N. J. According to the manufacturer, the attachment makes it possible for the microscope to be

used in viewing some surface defects, viewing in crevices and indentations, and viewing specimens at high temperatures. The system is said to operate well under phase-contrast procedures, making it particularly suited in dissection. The erect-image feature, it is claimed, eliminates awkwardness in manipulation of specimens, since movements of the hand need not be

reversed in relation to the image.

The attachment is designed to fit any standard microscope, replac-



Microscope equipped with Edmund attach-

ing one of the objectives lenses and revolving readily along with the other objectives in the nosepiece. The heart of the system is a half-aluminized plate which first passes light rays then, when they are reflected back to

NELCO CARBIDE TIPPED SLAB MILLS

Records!

HERE ARE ACTUAL PRODUCTION FACTS

carbide Speed Steel tipped slab mill slab mill 80 RPM Feed (in/min) 13/4 111/2 Production 29 pcs. per hour 6 pcs. per machine No. of 250 pieces per arind Average) Finish Wavy-needed Superior machine extensive finish polishing

High

Nelco

Machine Army Automatic Rifle Receivers in ½th the time . . . to better finishes . . . with 30 times more pieces per grind than conventional cutters!

An amazing story, but TRUE! Working on tough, scaly Perlitic Malleable iron castings, Nelco carbide tipped slab mills took a healthy 100 - 125 bite—a full 3½ inches wide—on a 3 horsepower machine at the incredible feed of 11½ inches per minute! Not only did the Nelco slab mills surpass conventional cutters in speed, but produced better finishes, 400% more production per machine!

This example is typical of the time-saving, money-saving benefits users report when using Nelco carbide tools. With nearly 800 tools regularly stocked, you can order—and GET—"special" tools at standard prices. For full information on the complete Nelco line, send today for 48 page catalog.

NELCO TOOLS

For that Extra

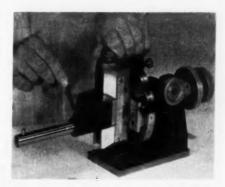
EDGE in Production

NELCO TOOL COMPANY, INC. MANCHESTER, CONNECTICUT

it by a first surface mirror, reflects the light rays correctly positioned for viewing by the objective. The unit is available in two sizes; namely, the 40X objective with a f/1 of 4 mm. and the 20X objective with a f/1 of 8 millimeters.

Improved Unit Dresses All Angle-Tangent-to-Radii Grinding Wheel Forms

Perfex Gage & Tool Co., 123 Avery St., Mt. Clemens, Mich., has announced an improved model of its Tangi-Matic Dresser which is designed for precision dressing of all angle-tangent-to-radii grinding wheel forms. The redesigned unit incorporates a removable arm which permits the use of extension arms for dressing large diameter wheels. According to the manufacturer, the unit dresses angles tangent to radii a full 180 degrees. In



Perfex Improved Tangi-Matic Dresser in use

setting up, the dresser is said to require no Jo Blocks, height gages, micrometers or other precision instruments and need not be removed from the grinder chuck. A built-in micrometer, it is claimed, provides direct reading and accurate adjustments.



Once you use and compare Sterling stacking boxes, you'll know why we invite comparision in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box . . . no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling "Top Rim" Steel Stacking Sox with drop handles. Size: 18" x 12" x 6".



Floating Holder Features Lockand-Eject Collet Action

Designated as the "JT," a lock-andeject type floating holder which is said to eliminate the use of a drift when ejecting tools has been announced by Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill. Foursplit chucks for taps and two-split



Scully-Jones "JT" Lock-and-Eject Type Floating Holder

chucks for reamers are locked and ejected by means of a threaded nut (revolving on ball bearings on the nose

> of the holder) which engages a thread on the end of the chuck.

By rotating the threaded nut clockwise, the chuck is drawn into the holder and compressed evenly and tightly on the shank of the tool. Opposite rotation of the nut unseats the chuck, permitting easy removal of tools. The chuck is quickly ejected by turning the lock and eject nut until the threads are completely disengaged.

The floating mechanism is of the double-gear spline drive design which is said to provide unrestricted float, prevent binding and eliminate "dead" spots. The holder is designed chiefly to compensate for misalignment between the tool and the work on multiple - spindle operations.

PLENTY OF LIGHT here You Wan



With MAGNA-HOLDERS

You save time . . . assure better work with these portable magnetic base units. They're LIGHTING LIFESAVERS in the shop on all machines, for layout and inspection, close assembly operations, maintenance and repair.



up to 100 Watt

Powerful 50 lb. pull permanent magnetic bases! Attach instantly to any ferfous surface, curved or flat! Quickly positioned or re-

moved! Extension arms set in ball sockets allowing universal adiustment

Globes adjustable to any position!

Magna-Holders are produced by the Country's largest exclusive manufacturer of magnetic base instruments and custom accessories including MAGNA-HOLD-ERS for all type dial indica-tors, flood lights, inspection lights, flash lights, safety shields and magnifying glasses. If your dealer cannot supply-order direct. Write Dept. 34-E.

Model No. 600- Model No. 675 Inspection Light. Flood Light with 6 Complete with 6 foot cord - takes foot cord and 25 watt bulb.

standard bulb. Price . . . \$6.50 Price . . . \$8.50



Grinder Automatically Downfeeds, "Skipfeeds" and Reverse Crossfeeds

Designated as the Model D10, a large size hydraulic surface grinder which is designed to automatically downfeed, "skipfeed" and reverse crossfeed has been announced by The DoAll Co., Des Plaines, Ill. With a large working area (10 x 30-in. chuck size), the machine is said to still retain toolroom precision. According to the manufacturer, the design of the



DoAll Model D10 Hydraulic Surface Grinder in use

grinder permits ready incorporation of modifications (at the factory) for automatic flat or crush form (contour) grinding operations, making possible mass production of parts. With regard to form grinding (manual or automatic), the large work capacity of the machine permits the crush roll dresser or other kind of form dresser to be positioned permanently at the ends of the work table while adequate space remains for work. In ordinary form grinding, and particularly in production form grind-



Queen City

So good they're guaranteed: "try one for 30 days... if you're not satisfied, return it." It makes cents... and dollars... to buy equipment like that at price: 20 to 30% under competing makes!

The complete range of Queen City Grinders and Buffers... floor and bench types... is described in newly-revised literature.

WRITE FOR FREE CATALOG TODAY!

QUEEN CITY MACHINE TOOL CO. 3911 Kellog Ävenue, Cincinnati 26, Ohio "High Quality—Low Cost—For over 50 Years" ing operations where frequent wheel dressing is required, the initial dressing setup remains on the grinder.

Equipped with the proper optional features, the Model D10 can be used as an automatic crush form grinder which will transfer the contour of a crush dressing roll to the workpiece. Where practical, many pieces may be held in a fixture and ground simultaneously. With the inclusion of addi-

tional optional features, the machine can be arranged for automatic surface grinding where the requirement is to produce a flat surface, accurate in thickness to a predetermined dimension. For toolroom application, the automatic features of the grinder, if it is so equipped, can be quickly disengaged, permitting manual control and operation as a conventional hydraulic surface grinder.



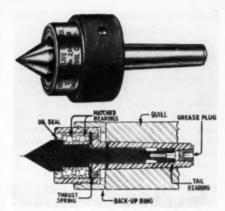
Seamless Tubing Steel

Designated as Universal Cyclops Uniloy 19-9DL, an alloy steel which is available in seamless tubular form for use in equipment operating under conditions involving high stresses and high temperatures has been announced by the Tubular Products Division of The Babcock & Wilcox Co., Beaver Falls, Pa. Through the use of the hot extrusion production process, the tubing is now available in a limited size range. At present, the alloy is most commonly used in jet engines, experimental aircraft and gas turbines and is said to have unusually good strength at temperatures up to 1,200 deg. F.

The alloy is a predominately austenitic stainless steel containing chromium, nickel, molybdenum, tungsten and small quantities of columbium, tantalum and titanium. According to the manufacturer, the alloy is highly corrosion and oxidation resistant.

Live Center Features Back-Up Ring

The Melin Tool Co., 3373 W. 140th St., Cleveland 11, Ohio, has announced the Howard Live Center, which features a back-up ring which backs against the face of the quill, transferring the rigidity of the quill to the head of the center. According to the manufacturer, the back-up ring reduces the spring in the body of the center at a ratio of four to one, thus reducing the work and helping eliminate runout. Matched ball bearings, mount-



Howard Live Center

ed in tandem in the head, and oil impregnated bronze bearing in the tail of the shank are said to permit thrust and radial loads at high speeds. The center has a full length solid spindle.

Folding Magnifiers ideal for toolbox, bench or pocket

Write today
for tell-all
handbook and
catalog,
"INDUSTRIAL
MAGNIFIERS,
HOW TO
CHOOSE AND
USE THEM"

Highest quality lenses, precision ground and polished, made by Bausch & Lomb, world leader in optical quality and value. Lightweight, extremely durable 1, 2 and 3-lens magnifiers ranging in power from 3X to 20X. These are in the complete line of industrial magnifiers stocked by your industrial supplier, manufactured by Bausch & Lomb Optical Co., 50529 Bausch St., Rochester 2, New York.







BAUSCH & LOMB
Industrial Magnifiers

Gasket-Mounted Four-Way Valve is Shock Resistant

Designated as the Series 6600, a gasket - mounted solenoid - operated four-way valve which is said to be fully shock resistant and which is designed for 3,000 p.s.i. oil hydraulic service has been developed by Rivett Lathe & Grinder, Inc., Dept. MMS, Brighton 35, Boston, Mass. According to the manufacturer, impact and shock are eliminated by the use of a scalloped design on the valve spool that opens or closes, gradually increasing or decreasing areas to the ports as the spool is moved left or right. Metering grooves built into the spool, plus a choke block assembly to control the speed of the spool, aid in allowing the flow to enter and leave the valve with an easy, smooth action, and permit the use of the valve as a decompression valve, as well as a four-way valve. The pilot valve has a roomy wiring box

> with a terminal wiring strip. Continuous - duty shock - mounted solenoids are dust sealed, moisture

Rivett Series 6600 Sub-Plate Mounted Four-Way Valve

resistant, and have low current requirements. The pilot valve, it is claimed, may be used as a direct solenoid valve by itself for control of 3,000 p.s.i., is furnished in 1/4 inch size, and operates at 3.6 g.p. m. at 15 feet per second.

Designed for oil or hydraulic service, the Series 6600 valve is available in four



Pines Portable End-Finisher is

especially designed for fast, ac-

curate work. Small and compact,

its exclusive operating features

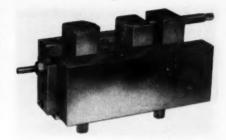
save time. Forward travel of operating lever clamps and feeds work to rotating cutters in one pass. Operator always has one hand free for stock handling. Equipped with quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, grease-sealed precision bearings. Unit illustrated handles stock diameters up to 2". Maximum feed



PINES ENGINEERING CO., INC. Specialists in Tube Febricating Machinery

444 WALNUT . AURORA, ILLINOIS

standard models; namely, double solenoid, standard action; double solenoid, spring centered; single solenoid, spring return; and single solenoid, spring centered. Seven spool designs can be supplied for three and four-way control. The valve is furnished with gasket mounting only, or with threaded sub-plate.



Horton Sliding Pinch-Type Unit

Unit Holds Thin Walled Parts in an "As Is" Position on Chucks

A sliding pinch-type unit for holding thin walled parts in an "as is" position on chucks or faceplates has been announced by Horton Chuck Division of The E. Horton & Son Co., Windsor Locks, Conn. The unit is mounted in a T-slot of a chuck or faceplate, in whatever quantities and combinations are required. The unit features a special floating arrangement

for quick self-alignment to conform to the shape of the workpiece. The jaws, having a pinching action, hold the workpiece in position ready for machining, and also minimize the distortion of the thin walled pieces. The unit has a pinching capacity up to 1½ in. in thickness, and the diameter capacity is limited only by the size of the chuck or faceplate on which the unit is used.



the new miracle grinding wheel bond

Greatest selection of sizes and shapes for every application. Best of all, deliveries are good . . . ready when you need them.

Try Chicago Mounted Wheels—bonded with 79E Bond—and you'll never buy any other! This tough new grinding wheel bond, exclusive with Chicago Wheel, has taken the industrial world virtually by storm, doing a better grinding job faster.

CHICAGO WHEEL & Mfg. Co.

Dept. MMS, 1101 West Monroe St., Chicago 7

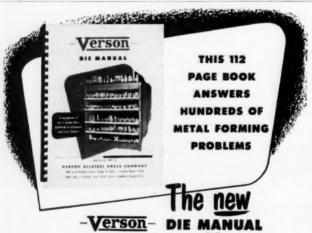
Oils Are Designed for Cushioning Operations

Designated as Wales Comproils, compressible liquids which are used in Wales Hydra Springs have been made available by Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y. The development combines the principle of liquid compressibility at ultrahigh pressures with lubricity. The oils are ideal for use in cushioning operations and also have varied usage in hydraulic systems.

Punch and Die Retainer Is Adjustable

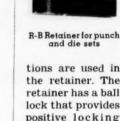
Especially suitable for short production runs on light gauge metals, a retainer which can be easily adjusted to any desired position on T-slotted or drilled and tapped comercial die sets has been announced by Richard Brothers Punch Division, Allied Products Corp., Dept. 76, 12625 Burt Rd., Detroit 23, Mich. Stripping is accomplished with R-B rubber strippers or rubber-covered springs. Standardized

R-B punches and die buttons of standard shapes or special shapes to users specifica-

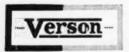


AVAILABLE NOW

JUST off the press, the new enlarged Silver Anniversary edition of the Verson Die Manual contains 112 pages devoted to a pictorial presentation of Verson press brake dies and special tooling along with detailed text and tables on how to select dies for specific jobs, tonnages required, etc. To get your copy simply write on your company letterhead.



tions are used in the retainer. The retainer has a ball lock that provides positive locking and automatic alignment. The retairier is available for R-B punch shank diameters of 3/8, 5/8, % and 1 in. and die button outside diameters of %, %, 11/4 and 13/4 inches.



358

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Ave., Chicago 19, III. So. Lamar at Ledbetter Dr., Dallas, Tex.

MODERN MACHINE SHOP

Unique Gage for Use on Centerless Grinders

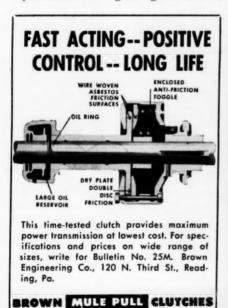
Several Air-O-Limit gaging components have been combined to form a unique gage for use on centerless grinders by Pratt & Whitney, Division Niles-Bement-Pond Co., 25 Charter Oak Blvd., West Hartford 1, Conn. Consisting of a snap gage, booster check valve and light signal control unit, the combined parts are designated as the Air-O-Limit Centerless Grinder Gage. The light signal control cabinet includes a standard gaging indicator calibrated to meet requirements. Nullmatic and Kendall regulators along with pressure gages, pneumatic precision relays with electric pressure switches and red and green limit lights for over and under size indication.

Basically, the gaging circuit used is the standard back pressure gaging system. The pneumatic control system in the light signal unit is



Pratt & Whitney Air-O-Limit Centerless Grinder Gage. (Inset) Snap gage and booster check valve mounted on a centerless grinder

said to be unusually accurate. Readily adjustable control limits can be pre-set to any desired scale setting to meet varying tolerance requirements.





The booster check valve unit can be adjusted to eliminate the complete drop-off of back pressure between parts in through-feed gaging operations. The booster action itself imparts a fast indicator action.

Fork Truck Is Designed for Narrow Aisle Operations

The Raymond Corp., 88-120 Madison St., Greene, N. Y., has developed a

narrow aisle electric fork truck for warehouse operations. The machine is a modified straddle truck with four base legs— 5×2 in. load wheels straddle the pallet while 7-in. wide elevating forks lower over another set of base legs with dual 5×2 -in. wheels. This arrangement is said to provide maximum stability at heights up to 158 in. and ensure against excessive wheel and floor wear. According to the manufacturer, the truck has ex-

cellent turning characteristics and can right angle stack pallet loads from aisles only 6 ft.

Bradford HIGH SPEED DRILLING MACHINES



Meet high production requirements with Bradford automatic or semiautomatic cam feed machines. Use them for drilling . . . tapping . . . boring . . . reaming . . . spot facing . . . hollow milling . . other operations. They can be furnished with single spindle or multiple spindle drill heads with fixed or adjustable center distances . . . arranged around special Bradford fixture designed to take work quickly, position it accurately. Safety clutch prevents overload.

Bradford machines are available with any 1 to 5-hp NEMA motor . . . spindle speeds from 100 to 2500 rpm.

Three-unit 32spindle machine drills 32 holes simultaneously in cast-iron meter housings at rate of 240 parts per hour.

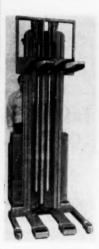




C-130-HMT

THE BRADFORD MACHINE TOOL CO.

658 EVANS STREET . CINCINNATI 4, OHIO

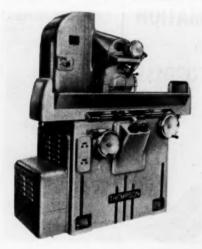


Raymond Narrow Aisle Electric Fork Truck

wide. The truck is designed for use with skids and open face or four-way entry block type pallets where high lifts are required.

Surface Grinder Is Suitable for Toolroom or Production of Small Parts

Designated as the Type F, a surface grinder which is said to be suitable for toolroom or production of small parts has been announced by The Thompson Grinder Co., Springfield, Ohio. According to the manufacturer, the machine provides precision, sensitivity and versatility for such jobs as gage blocks, intricate dies, jet engine parts and business ma-



Thompson Type F Surface Grinder

chine parts. Outstanding features of the machine include cross feeding wheel head grinding with the periphery of the wheel; rapid and accurate positioning of work; in-position wheel truing; simplified controls; small increments of down feed with wide increments of cross feed at 70 f. p.m. table speed and fast spark out; flame hardened and ground bed ways with no work surface overhang; flame hardened cross slide ways; integral motor drive to the spindle; two-speed 1,800/36,000-r.p.m. 1½-h.p. motor with safety interlock to permit the



use of either 12 or 7-in. diameter grinding wheels; low pressure hydraulic system; automatic table lubrication; and built-in coolant system.

The Type F is available in either $6 \times 10 \times 18$ -in. or $8 \times 10 \times 24$ -in. sizes. Accessories which are available for the machine include automatic down feed; micrometer back stop; dust collector; contour dressers; high speed spindle attachment; magnetic chuck; and magnetic coolant separators.

Hand Grinder Is Designed for High-Speed Milling and Grinding

For high-speed grinding and milling, The Dumore Co., 1311 Seventeenth St., Racine, Wis., has announced the Series 35 Hand Grinder which utilizes a ½-h.p. continuous-duty-rated universal motor delivering speeds up to 35,000 r.p.m. The grinder is available for 115-volt or 230-volt, a.c. or d.c., 0 to 60 cycle operation with either a ½ or a ¼-inch collet chuck.

The grinder can be used with tungsten carbide mills, high-speed cutters, mounted points and

A MAJOR STEP IN AUTOMATION

Available To You With

PRECISION Automatic FLEXOPRESS

Operating at higher speeds—its design and unique construction are such to provide the greatest sustained production. This is an important weapon.

New Battle Of Competition

A race to produce better products and push costs down.

IMPROVE YOUR COMPETITIVE POSITION

A Precision Automatic TON Flexopress quickly obsoletes conventional type presses. It has astounded manufacturers — large and small — with its magic powers of Speed and Accuracy. An engineering triumph — a NEW technique with startling results.



PRECISION WELDER & FLEXOPRESS CORP.

134 E. McMICKEN AVE.

CINCINNATI 10, OHIO

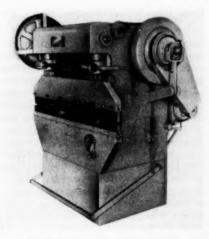


Dumore Series 35 Hand Grinder

wheels, abrasive bands, and so on. for grinding, milling, finishing, and polishing materials ranging from wood to hard alloy steel. The overall length of the unit. including the chuck, is 10% inches, and the body diameters are 21 and 116 inches.

Press Brake Is Designed for Production Runs

W. Whitney Stueck Inc., Old Saybrook, Conn., has developed an improved sheet metal bending brake, designated as the "Connecticut," which is designed for production runs. Powered by a ¾-h.p. motor, the brake is said to be capable of bending 16-gauge mild steel 4 ft. wide over a ½ in. die opening or 10-gauge mild steel 2 ft. wide over a 1½-in. die opening. According to the manufacturer, the machine has a speed of 40 strokes per



Stueck "Connecticut" Press Brake

minute, with deflection minimized by support of the main crankshaft at both ends. A reversing switch permits the ram to be backed off in case of jamming. The brake incorporates a built-in back gage, operated from the front, which is said to permit rapid and accurate resetting.

Standard features of the press brake include oilite bearings on all shafts, anti-friction bearing mounting of the flywheel, and extra wide 32-in. clearance between the side frames. Maximum die space is 7 in., maximum



blue background. Speeds up layout work and cuts costs. Merely wipe surface clean and brush on layout fluid. Dries instantly. Write on your company letterhead for free sample. Advise us if your local supply house doesn't carry.

DAYTON ROGERS Manufacturing Company

MINNEAPOLIS 7. MINNESOTA



stroke is 2 in. and adjustment is $1\frac{1}{2}$ in., providing a shut height over the die block of $3\frac{1}{2}$ inches.

Lathe Attachment Turns Bar Stock to Unlimited Lengths

Turnomat Co., Inc., Dept. MM, Brockport, N. Y., has announced the Karge Profile-Tracer "Turn-Mat," a three tool position lathe attachment. With the attachment, it is claimed.



\$29.95

Gaymark No. 41 Magnetic Chuck

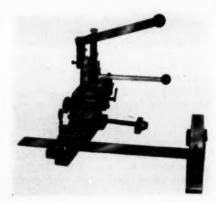
Parallels
7/8 x 2 x 4

- Silver Brazed
- Reinforced With 2 Steel Rods
- Precision Ground to .0001 Parallelism
- Adjacent Sides Ground At Right Angles Individually Priced At \$17.50 ea.

Immediate Delivery
Shipped Open Account For Your Approval
Available In All Sizes
Your Inquiries Invited

Gaymark Machine Tool Co., Inc.

12 CHURCHILL AVENUE WHITMAN, MASS.
TEL. WHITMAN 462

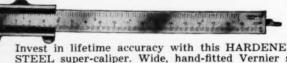


Karge Profile-Tracer ''Turn-Mat'' Three Tool Position Lathe Attachment

bar stock (round, square and hexagon) in all metals and plastics from 1/32 to 31/2 in. in diameter can be turned, formed and sized to unlimited lengths, diameters, straight or taper to a micro finish within tolerances of 0.0005 in. or better-without the use of follow rests, rollers or bushings. The self-aligned spindle of the attachment rotates in its own high precision ball bearings, and since the bar stock is held firmly and concentric by a spring collet and adjusted to the proper tension, the attachment can be slid over the bar stock and the spindle rotated at the same revolving speed as the lathe spindle.

According to the manufacturer, permanent precision positioning of single

precision PLUS!... ETALON No. 17



Invest in lifetime accuracy with this HARDENED STAINLESS STEEL super-caliper. Wide, hand-fitted Vernier slide is smooth operating, easy to read. English or English and Metric graduations. In rich wood contour case.

Ask your dealer*, or write

**FO.8.*, N.Y.*

ALINA CORPORATION . 401 BROADWAY, NEW YORK 13, N. Y.

or multiple cutting tools which are located on dead center and close proximity to cutting tools makes it possible to take unusually deep cuts with no chatter or visible tool marks and produces a fine surface finish. Alterations to the lathe are not necessary. One tie bolt through the compound rest slot fastens the attachment and, at the same time, aligns and centers the cutting tools.

Mallet Is Designed for "Soft" Pounding

New Plastic Corp., 1026 N. Sycamore, Los Angeles 38, Calif., has announced the Nupla Soft-Faced Mallet which is designed for use in all industries where "soft" pounding is required. The head of the mallet is made entirely of Nuplaflex, a plastic which is said to have the property of recovering its shape when dented by hard blows. According to the manu-



Nupla Soft-Faced Mallet

facturer, the mallet will not chip, flake or mushroom. To cover a complete range of industrial pounding requirements, the mallet is available in four hardnesses; namely, hard, tough, medium and soft, each distinguished by a distinctive color.

Since there are no metal parts to cause sparking, the mallet is safe for use around inflammables or explosives. A head design innovation is said to eliminate projection of the handle through the head, thus making all surfaces usable. Due to the nature of the plastic used, the mallet cannot mar the finest surfaces.



cuts mouldings, tubes, strips of metal and compositions . . . and accurate to .005 inch!



An excellent production machine that has proved tiself in leading plants. Makes straight cuts with saw or cut-off wheel. Self-contained and compact. Operates lightly with no rebound. Fully safeguarded. Cuts thousands of pieces without variation of .005 inch. Built to give long service and smooth operation.

Write for Bulletin 94-DM

OLIVER MACHINERY COMPANY

GRAND RAPIDS 2, MICHIGAN



Des Plaines, III.

fixtures

34

SUPEREAM

THE ONLY DECIMAL REAMER

with all FLUTES ground Face and Back After Heat Treatment...

PREVENTING

No. 720

CLOGGING or FREEZING of CHIPS for REMARKABLE

SMOOTH REAMING

All diameters are held to plus .0002 and minus .000 for close sizing. Size markings are stamped half-way up on shanks so they cannot be obliterated by drill press chucks.

ROSE CHUCKING REAMERS

Available in the above four styles on request. Designate by "R" in front of style desired.

* In Emergency PHONE Libertyville 2-4200.

No. 700 Straight Flute

No. 730 30° Left Hand Spiral No. 740

No. 720 7° Left Hand Spiral

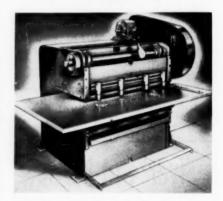
7° Right Hand Spiral

TWENTIETH CENTURY MANUFACTURING CO.

ROUTE 176 and BRADLEY ROAD BOX 429M. LIBERTYVILLE, ILL.

Shear Has Slide Assembly Which Counteracts Rearward Thrust

The Manchester Machine Corp., Manchester, Conn., has announced a squaring shear which incorporates a unique slide assembly that counteracts the rearward thrust caused by the cutting action. The shaft is mounted to the rear of the slide, producing a forward thrust behind the upper blade. Plungers are provided with micarta pads to ensure firm grip and to prevent marring of highly polished sheets. The plungers are quickly ad-



Manchester "52" Squaring Shear

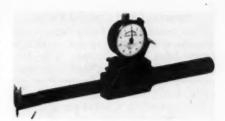
justable for width and gauge of materials to be sheared. Operating at a standard speed of 120 blade strokes per minute, the shear is available in two models; namely a 52-in. model with a 24-in. gap and a 16-in. model with a 7½-in. gap. The "52" machine measures 75 in. high x 90 in. wide x 72 in. deep overall, and the "16" shear measures 71½ in. high x 41 in. wide x 49 in. deep overall.

Cemented Carbide Blanks for Heavy-Duty Steel Cutting

Carboloy Department of General Electric Co., 11143 E. 8 Mile Rd., Detroit 32, Mich., has announced that its cemented carbide grade 370 for heavyduty steel cutting is now available in a wide range of standard blanks. The blanks offered includes Styles 1000 and 2000, 3/16 in. thick and smaller; Style 0000 blanks, ¼ in. and over; Style 5000 (pointed nose standards); clamped on blanks; and all inserts which have not been previously announced by the company.

Gage Inspects Internal Snap Ring Grooves from 0.240 to 5.270-Inch Diameter

Reliant Industries, 4947 Firestone Blvd., South Gate, Calif., has announced a dial indicator gage for inspecting internal snap ring grooves from 0.240 to 5.270-in. diameter. The gage may also be used for checking out-of-round, inside diameters, deep holes, recesses, tapers and inside spherical radii. Said to be fast acting.



Reliant Snap Ring Groove Gage

streamlined, light and easy to handle, the gage is self-centering and is set directly to a master ring gage. A slight rocking motion in one direction is said to indicate quickly the minimum reading of the diameter on the indicator. Gaging motion is transferred directly through a lever to the gage indicator. The dial indicator is graduated in 0.0001-in. increments, thus making it possible to check dimensions having unusually close tolerances.

MICRO-HEIGHT GAUGE

BY FAIRFIELD GAUGE CO.



NO OTHER GAUGE COMPARES FOR FAST, ACCURATE LAYOUT AND MEASURING

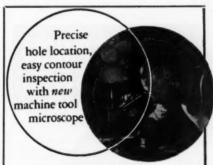
Capacities to 6" when used with this Fairfield Gauge 3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths. Use as a scriber for fast layout, or insert dial indicator for quick, accurate inspection.

Exclusive distributor for U.S. and Canada:

CLEVELAND INSTRUMENT CO.

735 Carnegie Ave., Cleveland, O.



- Wide field of view (1/4"); 30x
- · Gages accurately to .0001-at a glance
- Mounts on offset bracket, or directly in the spindle
- · Fits nearly any machine tool
- · Image always appears erect and true
- Ideal for checking slots, contours, surface conditions, or transferring hole locations from template to workpiece.

Write today for complete details.

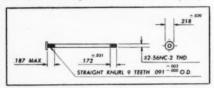
THE PERKIN-ELMER CORPORATION



Norwalk, Connecticut

Special Cold Forged Parts

Cold headed parts featuring unusual structural strength are now available from John Hassall, Inc., P.O. Box 2177, Westbury, N. Y. The accompany-



Drawing of cold headed brass fastener

ing drawing is typical of millions of cold headed parts produced by the company. In addition to heading, this brass fastener has been fluted at the head end and threaded at the other end.

Other secondary operations which can be performed on cold headed parts include drilling, knurling, milling, swaging, slotting, pointing or reheading. Parts can be made from Monel, stainless steel, carbon steels, drill rod, music wire, brass, copper, lead, aluminum, bronze, nickel silver, precious metals, and other materials.

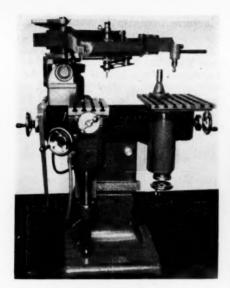
Improved Universal Diesinking Machine Has Larger Capacity

J. Arthur Deakin & Son, 150-28 Hillside Ave., Jamaica 38, Long Island, N. Y., is now marketing an improved Alexander Model 3 Universal Diesinking Machine which features a larger capacity. The machine is said to be ideal for the production of molds and dies, in either two or three dimensions, where irregular forms are important and can handle a workpiece weighing up to 1,000 lb. The machine is provided with 14 spindle speeds ranging from 475 to 9,500 r.p. m. in geometric progression. The spindle is provided with standard ball races and accommodates cutters up to 3/4 in. in diameter. A balancing device is said to eliminate the need for a









Improved Alexander Model 3 Universal Diesinking Machine

weight arm, and a simple hand adjustment in the operating position enables the pantograph to be balanced at any ratio in any position. A flangetype motor simplifies the drive.

The casting carrying the pantograph has been modified to provide increased working area for all ratios. A second lead screw has been added to give the copy table longitudinal feed in the same way as the work table. Principal slides have wipers and the main horizontal and vertical lead screws are protected with dust covers. The work table measures 8 x 14 in. and has a longitudinal feed of 17% in, and a cross feed of 6 inches. The copy table has a longitudinal feed of 7% in., and the maximum distance between the center of the work table and the copy table is 26 inches.



any and all requirements

Let Rowbottom quote on your needs and take advantage of half a Century's specialized experience and modern facilities. Any type...any quantity. Submit drawings or specifications for quotation.

Investigate Rowbottom Service NOW!

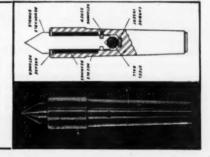
THE ROWBOTTOM MACHINE CO. WATERBURY CONNECTICUT

Also builders of Cam Milling and Cam Grinding Machines.

GREAT NAMES trust WEE LIVE CENTERS

You will find Wee Live Centers on the production lines of big name companies. They offer faster, chatter-free, accurate performance in lathes, grinders, hobbers. Runout held to .00015. Test one, learn why leading companies order and re-order. No. 2, M.T., \$21.00. Request complete price list, many sizes, tapers, shanks. Write direct, if distributor cannot supply you.

HERBERT CROSS & SON . Bala-Cynwyd 1, Pa.





1051 CHATEAU STREET, PITTSBURGH 33, PA.



For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. - Detroit 13, Mich.

Machine Inspects 10 Dimensions Simultaneously

Cosa Corp., 405 Lexington Ave., New York 17, N. Y., has announced the Sigma Type A301D Multi-Automatic Inspection Machine which is designed to simultaneously inspect 10 dimensions, or less, on parts measuring up to 1 x 1 x 2 in. During inspec-



Sigma Type A301D Multi-Automatic Inspection Machine

tion, each dimension is checked by a Sigma Microlimit gage which is said to be accurate to within 0.00005 in. and which can be quickly set to required tolerances. According to the manufacturer, the machine is capable of inspecting 2,300 parts per hour when fed from hand-loaded magazines and 3,600 parts per hour when hopper fed.

Inspected parts are automatically separated into three groups — oversize, undersize and acceptable — then dropped into separate drawers at the side of the machine. Built-in counters tabulate the number of parts submitted for inspection and the number accepted.

Abrasive Belt Grinder Has 101/2-Inch Throat Depth

Designated as the Model F-1, a 1-in. flexible abrasive belt grinder which has a 10½-in. throat depth, permitting the finishing of large, irregular shapes and those hard-to-get-at areas, has been announced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. According to the manufacturer, the work table and belt platen permit accurate grinding of flat surfaces. Irregular contours can be ground on a "free" belt by removing the platen and the work table. Said to be ideally suited for toolrooms, machine shops, maintenance departments,



Hammond Bench Model F-1 Flexible Belt Grinder

sheet metal shops, and so on, the grinder is available in either bench or floor model types with a built-in dust collector.

IMMEDIATE DELIVERY from STOCK

STANDARD CIRCULAR FORM TOOL BLANKS

(Made of High Speed Steel) Soft or Hardened

Widt	No. 00 B. & S.		No. 0 B. & S.		No. 2 B. & S.	
	offt	Hardened	Soft	Hardened	Soft	Hardened
1/4"	\$1.00	\$1.50				
5/16"	1 10	1.60	\$1.75	\$2.20		
3/8"	1.20	1.70	1.90	2.40	\$2.80	\$3.50
7/16"	1.30	1.80	2.05	2.60	3.00	3.85
1/2"	1.40	2.00	2.20	2.80	3.20	4.20
9/16"	1.50	2.20	2.35	3.05	3.45	4.50
5/8"	1.65	2.40	2.50	3.30	3.70	4.90
11/16"	1.80	2.60	2.65	3.55	4.00	5.40
3/4"	2.00	2.80	2.80	3.80	4.30	5.80
13/16"	2.20	3.00	2.95	4.00	4.60	6.20
7/8"	2.40	3.20	3.15	4.20	4.90	6.60
15/16"	2.60	3.60	3.30	4.40	5.20	7.00
1"	2.80	3.80	3.45	4.70	5.50	7.40
1- 1/16"			3.60	5.10	5.85	8.00
1- 1/8"			3.75	5.50	6.20	8.60
1- 3/16"					6.60	9.20
1- 1/4"		1			7.00	9.80



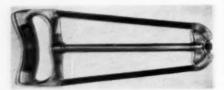
Save time and money with these stock blanks.— Also, prices on request for Blanks for other make machines or for Blanks made of HIGH COBALT STEEL.

Send for COMPLETE STANDARD TOOL CATALOG

SOMMA TOOL CO., INC.

Hack Saw Holds Two Blades

Designated as the "Double Hac-Saw," a hack saw which utilizes an unusually light but sturdy frame that accommodates two 12-in, blades has



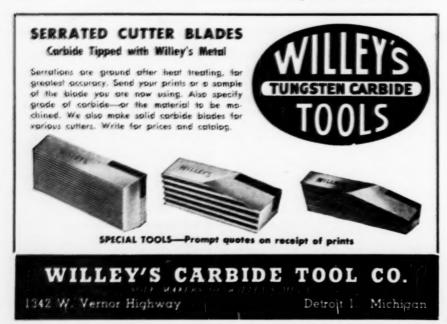
Dreier "Double Hac-Saw"

been announced by Dreier Brothers, Inc., 5642 Lake Park Ave., Chicago 37, Illinois.

One blade is fine tooth for light work and the other blade is coarse tooth for heavier work. Each blade is capable of cutting a full 5-in. diameter. A single turnbuckle tightens both blades at the same time.

Plastic Metal Can Be Sawed, Drilled, Tapped, Threaded and Ground

Designated as "Devcon." a puttylike material consisting of fine steel powders and an unusually strong plastic that is designed for use in making permanent and durable drill jigs. fixtures, forming dies and similar products has been announced by Chemical Development Corp., Danvers, Mass. According to the manufacturer, the material is as easy to use as modeling clay, no heat or pressure being required. It can be sawed, drilled, tapped, threaded and ground with conventional metalworking equipment. A large mass of Devcon, it is claimed, can be applied to a vertical surface without running or sagging. and it has unusual adherence to steel and high impact, tensile and compressive strengths. The material can be chrome, nickel or copper plated or metallized by conventional methods.



Horning Press Has Capacity of Five Tons

Service Machine Co., 7627-29 S. Ashland Ave., Chicago 20, Ill., has announced the Rousselle 5-Ton Horning Press which is available in either bench or floor models with ample clearance beneath the bed or horn for handling large, bulky work. The bed table has a 4-in. diameter hole for clear-through slug clearance. The bed can be mounted in six different keyed



Rousselle 5-Ton Horning Press

positions in 1-in. steps, providing die space up to 10 in., or it can be quickly removed for easy accessibility to the horn hole and for drilling die set holes. When the bed is removed, special fixtures can be mounted directly to the press, since the frame is accurately machined and can be drilled, tapped or bored for special jobs. The bench model has reversible legs so that the vertical frame surface can be mounted flush with the edge of the bench to provide obstruction-free clearance.



For drilling, reaming, spot-facing, counterboring and tapping. Variable speed spindle with built-in back gears, driven by a ½ HP single or three phase built-in motor. Completely enclosed drill head design; no belt changing required.

FEATURES . . . Convenient direct reading infinitely variable spindle speed control dial, together with a drill size, speed and material chart; quick-set vernier depth control; sealed-for-life ball bearings throughout; counterbalanced head on bench model; tilting table and ground base on floor model; No. 2 Morse taper or Jacobs No. 2A taper spindle.

Model 602—600 to 4000 RPM, complete with motor and worklight \$290.00 and up.

Write for free literature.

The ELECTRO-MECHANO Co.

265 E. Erie St.

Milwaukee 2, Wis.

Milling Machine Vise Has Swivel Base

Chicago Tool & Engineering Co., 8399 S. Chicago Ave., Chicago 17, Ill., has announced the Palmgren No. 60B



Palmgren No. 60B Flanged Milling Machine Vise with swivel base

Flanged Milling Machine Vise which features a swivel base and which is designed for heavy-duty service, such as milling, drilling, grinding and other machine operations which require a rugged holding device. The vise is provided with flanges for clamping down to the machine table and may be used with or without the 360-degree graduated swivel base. The base is equipped with two bolt lugs for clamping to the machine and is also furnished with two th-in. keys and screws to fit machine table slots.

The vise utilizes jaws measuring 6 in. wide x 2 in. deep with an opening of 6 in. Removable ground steel jaw plates are provided, and the heavy Acme thread adjusting screw is equipped with a screw bushing that can be replaced.

Machine Sharpens High Speed Steel and Carbide-Tipped Hobs

Designated as the No. 6-5, a hydraulic hob sharpening machine which is designed for production sharpening of high-speed steel and carbide-tipped hobs and form-relieved cutters has been announced by Barber-Colman



BENCH & PEDESTAL TYPES -- 6" to 12" WHEELS

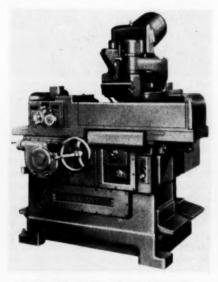


BALDOR ELECTRIC COMPANY
4380 Duncan Ave., ST. LOUIS 10, MO.

* ASK FOR BULLETIN 321-H

...............

Co., 754 Rock St., Rockford, Ill. According to the manufacturer, the machine provides accurate controls over flute spacing, rake angle, lead of gash and surface finish. The machine is capable of handling a wide variety of tools with straight or helical flutes, shell or shank type, up to 6 in. in diameter x 5-in. face width. Equipped for wet grinding for maximum production, the machine utilizes a diamond wheel.



Barber-Colman No. 6-5 Hob Sharpening Machine

All elements of the machine cycle are automatically controlled by making the proper settings on conveniently-located controls. Once the original settings have been made, the machine automatically indexes and feeds to remove exactly the desired amount of metal from each flute. The table speed can be easily adjusted by turning a hydraulic flow control valve. A central push-button panel provides finger-tip control over machine elements.



9 sizes — 5 combinations per size — for hole patterns 3" through 15" dia.

Standardization makes for quick delivery and attractive price. Only a few minor parts need be made. Speed up machining operations. The operator merely feeds the parts — the Zagar Self-clamping Drill Jig does the rest. Zagar drill jigs are now "off the shelf".

Ask on your letterhead for Engineering Manual S-5

ZAGAR TOOL, INC. 24000 LAKELAND BLVD., CLEVELAND 23, O.



Drilling Machine Features Micrometer Controls for Locating Holes

The Hamilton Tool Co., 828 S. Ninth St., Hamilton, Ohio, is now offering. as an extra feature for its super-sensitive small-hole drilling machine, a micrometer control for the positive location of holes in the precision drilling



MAGNIFIES the "hard to read" vernier scales on calipers and height gages. No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification

the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defanse work. Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Tools, and others of similar design. S No. 100 for 6" Vernier Calipers; S No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; S No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" and 60" Calipers.

For Complete Information Write, Phone or Wire

STEBAR COMPANY 711 W. Lake St. Minneapolis 8, Minn.



Hamilton "Maxi Jr." Drilling Machine with micrometer controls

of small units. According to the manufacturer, the equipment is designed to locate one or a series of holes by this method, assuring accurate positioning from center to center. The drilling machine is designed to supply senstivity, accuracy and stamina. The "Maxi Jr.," illustrated herewith, has a drilling capacity of 0.004 to 0.3125 in. in practically all drillable materials. The machine has a clearance from center of the chuck to the column of 5 in. and from the base to the chuck of 10 in. Spindle speeds range from 750 to 8,750 r.p.m. Machines of greater or less capacity also are available.



Thread Studs Faster KENT Automatic STUD THREADER

Magazine feed. Threads both ends simultaneously and automatically. Minimum air cutting time. One man attends several machines.

One machine threads study $\frac{1}{4}$ " to $\frac{1}{2}$ " diam. One machine threads $\frac{1}{2}$ " to 1" diam. (Both in various lengths of threads and studs.)

The KENT MACHINE CO., Cuyahoga Falls, O.

Drillers . Threaders . Slotters . Countersinkers . Bar Pointers

Chuck Provides Outstanding Collet Performance

Designated as the Model 96, a collet chuck which permits the use of Rubber-Flex collets on many different machine tools has been announced by The Jacobs Mfg. Co., West Hartford 10, Conn. According to the manufacturer, the chuck provides outstanding collet performance on grinders, milling machines, jig borers, jig grinders, lathes and various types of special machinery where a precise, compact collet closure is desirable.

The collet chuck is available in two types, the only difference being in their back mountings. The Type 96-05 is equipped with a No. 5 Jacobs Taper back mount, while the Type 96-F1 has a flange mount. Each type has a one-piece hardened steel body.

A conical bore in the front of the body accurately centralizes the Rubber-Flex collets. Mounted on the body by means of a deep-groove ball bearing is a hardened steel geared sleeve having a ground threaded bore which is threadedly engaged with the collet



Jacobs Model 96-05 Collet Chuck

closing the chuck. This nose is made of a hardened steel, and all working surfaces, including the threads, are

Rotation of the sleeve of the chuck

KUTMORE ADJUSTABLES



DESIGNED FOR ALL YOUR HOLLOW MILLWORK

- ANY COMBINATION OF ... TURNING ... TAPERING ... FACING ... CHAMFERING ... TREPANNING IN ONE PASS.
- EXCLUSIVE MICROMETER ADJUSTMENT FEATURE FOR RAPID SET-UP.
- CUTTING CAPACITIES FROM 1/32" TO 2" DIAMETER IN STANDARD STOCK, IMMEDIATE DELIVERY.

WRITE FOR CATALOGUE No. 20 MM

OUR ENGINEERING DEPARTMENT IS AT YOUR DISPOSAL ON YOUR HOLLOW MILL PROBLEMS

CARL WIRTH & SON, INC. 1625 CLINTON AVE. NO.

for initial engagement of the part to be held is accomplished by hand rotation of the sleeve. Final locking is effected by clockwise rotation of a geared kev.

Press Straightens and Checks Workpieces

Designated as the Hydropress, a straightening press which is designed to straighten and check workpieces without removing the work from the press has been announced by Arthur J. Hurt & Co., 360 S. Navajo St., Denver, Colo. According to the manufacturer, the press is equipped to fill the requirements of every straightening job-bars, rods, armature shafts, and so on. Operation of the press is said to be simple. To straighten, the workpiece is placed on the vee blocks,

> the ram is brought to the work, and the dial indicator registers the amount of runout. Ram



Your ONE Source

for ALL Centers — over 200 models — Standards and Specials for Lathes, Grinding, Milling, Spinning, Turret, Screw Machining, Burnishing and Gear Cutting operations.

problems.

Built to take weights up to 200 tons. Speeds to 4000

ACCURACY IS GUARANTEED

Call Your Friendly Distributor **CENTER Specialists Since 1908**



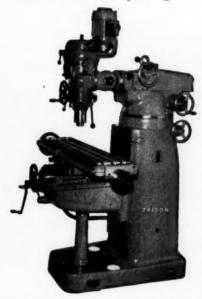


'Hydropress' Straightening

travel, it is claimed, can be kept to a minimum by easy adjustment. A checking pressure gage and the dial indicator for runout are said to afford fast and accurate work. The press has 5ton pressure for smooth operation.

Vertical Milling Machine Has Box-Type Ram

Trison Mfg. Co., 151 Mulberry St., Newark, N. J., has announced a turret-type vertical milling machine which features a box-type ram, sliding on gibbed V-ways. The ram is moved on the ways, backward and forward, by a handwheel with a graduated dial which is fastened to a pinion gear en-



Trison Turret-Type Vertical Milling Machine

gaging rack. The turret is also rotated, on a large diameter base, by a handwheel, worm and rack. According to the manufacturer, the head has full universal movement and can be rotated in three planes. The main rotation of the head is controlled through a handwheel, worm and rack. This method of head rotation, together with the box-type ram which provides a fixed ram position, is said to make it possible to set and reset the head quickly and accurately.



HARGRAVE

The Complete Line of Tested

TOOLS

The table of the machine measures 10 x 44 in., and all slides are protected by dust guard seals. The table has troughs for measuring rods and receptacles for micrometer indicators for both longitudinal and traverse setting. The machine has a longitudinal travel of 32 in., a cross travel of 10 in., and a vertical travel of 18 in. The maximum distance from the table to the spindle is 18 in. The milling machine is powered by either a 1.2-h.p. three-

phase 60-cycle 220/440 reversible motor of a 1.2-h.p. single-phase 60 cycle 110/220 reversible motor. Eight spindle speeds are provided, ranging from 264 to 4,100 r.p.m. Spindle travel is $5\frac{1}{2}$ inches.

Universal Joint Tapping Head Speeds Production

Errington Mechanical Laboratory, Inc., Staten Island 4, N. Y., has in-

troduced a universal joint tapping head which is said to speed production and ensure accuracy.



Errington Universal Joint Tapping Head

The head is available in two sizes: namely, the No. 0 with a 0 to 1/4in. tap capacity and four and six spindles, and the No. 1 with a 7/32 to 1/2-in. tap capacity and four, six and eight spindles. The head is made of sand cast aluminum with hardened ground gears and spindles (made in one piece).



380

Color Filling and Printing Machine Operates on 75-P.S.I. Air Pressure

Designated as the "Acroprinter" No. 507, a color filling and printing ma-



"Acroprinter" No. 507 Color Filling and Printing Machine

chine for light filling of small parts of metal, plastic and other materials with colored ink, enamel or varnish has been announced by The Acromark Co., 9 Morrell St., Elizabeth, N. J. Designed for operation on 75-p.s.i. air pressure, the machine is said to permit feeding of small parts with both hands, two parts being fed and marked at one time when of a justifiable nature.

The printing and filling part of the machine is driven by a gear arrangement and powered by an air unit. According to the manufacturer, the machine can print parts at speeds ranging from 15 to 120 per minute, depending upon the operator's feeding speed as determined by the size, shape, positioning and complexity of the part.

Printing inks for use on any material can be furnished in any color. The overall size of the machine is approximately 30 in. long x 12 in. wide x 8 in. high.

SCHAUBLIN

toolmakers' lathes for those who demand the ultimate in precision

The SV 102 Height of Centers..... 4"
Distance Between Centers 17"

For Complete Information Write Dept. MS

Largest Selection of SWISS

Precision Machine Tools in U.S.



HIRSCHMANN

CARL HIRSCHMANN COMPANY, INC., 30 Park Avenue, Manhasset, N. Y. BRANCHES: CHICAGO, WATERBURY, DETROIT, LOS ANGELES, MILWAUKEE REPRESENTATIVES IN PRINCIPAL CI: IES

Portable Band Saw Has Cutting Capacity up to 31/4 x 41/4 Inches

Designated as the Model 524 Porta-Band, a portable electric metal-cutting



Porter-Cable Model 524 Porta-Band Saw

band saw which is fast and light enough to be used free-hand in any position and which has a cutting capacity up to $3\frac{1}{4} \times 4\frac{1}{4}$ in., has been announced by Porter-Cable Machine Co., 2303 N. Salina St., Syracuse, N. Y. Weighing only 16 lb., the saw is powered by a ½-h.p. motor which turns over 94 times for every revolution of the drive pulley, thus providing a band speed of 240 s.p.f.m. under load. The blade is 0.020 in. thick, 44% in. long and ½ in. wide. The blade is available in a range of from 6 to 32 teeth per inch for all types of cutting. The entire machine measures 7½ in. high x 7½ in. wide x 19½ in. long.

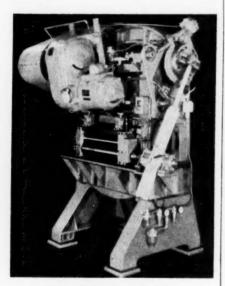
The housing is rugged die-cast satin-finished aluminum. All shafts passing into and out of the gear housing are protected by leather and neoprene seals so that grease is retained and dirt is kept out. The motor is controlled by a trigger switch located in a convenient loop handle. The pulleys and unused areas of the blade are completely guarded by the housing, exposing only the cutting section of the blade.

ACCURATE AUTOMATIC Morrison * AUTOMATIC FEED eliminates pushing a feed bar and insures accuracy. AUTOMATIC STOP cuts off the feed for any given depth. * AUTOMATIC RELIEF backs the work away from the cutter eliminating drag and insuring a clean keyseat. * AUTOMATIC CENTERING centers up the work quickly and easily. AUTOMATIC LUBRICATION feeds oil to all necessary moving parts. ★ SINGLE TOOTH CUTTERS for accurate clean keyseats and eliminating time and trouble in sharpening. * QUICK SET UP is one of the most important features. Write for descriptive circular. The D. C. MORRISON Company P. O. BOX 1017-8 . CINCINNATI 1, OHIO

40-Ton Automatic Press Has 28 1/2 -Inch Distance Between Uprights

Di Machine Shop, 2714 W. Irving Park Rd., Chicago 18, Ill., has announced the Diebel 40-Ton Automatic Press which has a 28½-in. distance between uprights and a back-to-front feed.

The press utilizes air cylinders to clamp the stock, assuring positive feeding without distortion of soft



Diebel 40-Ton Automatic Press

metals. The length of feed is said to be infinitely variable from zero to 13 inches.

The machine features a cylindrical-type ram for accurate alignment of the punch and die. Four bronze bearings support the crankshaft for maximum strength and shaft rigidity. The use of a pneumatic clutch in conjunction with a variable-speed motor is said to permit press operation which ranges from 72 to 360 strokes per minute.



have these exclusive* features

*Standard Full Ball Bearing Construction, including Spindles

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.





*Standard Slip-On and Slip-Off Template Construction

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.

6 Standard Models . . .

Models U-608 and U-1000—Ball Bearing Models U-6208 and U-10128—Plain Bearing, 11/16" or 1/2" min. centers Models U-608-BS and U-1000-BS—Ball Bearing Gear Case, Plain Spindles

Also Larger Adaptations and Full Line of fixed Center Drill Heads.

WRITE FOR FULL INFORMATION

Subsidiary of Thomson Industries, Inc.

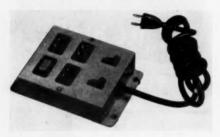
THRIFTMASTER Products Corporation

1034 N. PLUM STREET LANCASTER, PA.

Also Makers of DORMAN AUTOMATIC REVERSE TAPPERS

Portable Outlet Box Has Toggle Switch Controls

The Fostoria Pressed Steel Corp., Fostoria, Ohio, has announced a port-



Fostoria Portable Outlet Box

able outlet box which is wired complete with three outlets, one hot and two controlled by toggle switches. The unit is rated 10 amperes at 125-volt a.c./d.c. A red signal light illuminates when the unit is plugged in. The box

is made of 18-gauge steel supported on four rubber feet. A 6-ft. two-conductor rubber-covered cord with a molded rubber two-prong plug is furnished with the unit.

Rubber-Cushioned Abrasives Compounded with Silicon Carbide

A series of rubber-cushioned abrasives compounded with silicon carbide, as well as aluminum oxide, has been announced by Brightboy Industrial Division, Weldon Roberts Rubber Co., 95 N. 13th St., Newark 7, N. J. Both the aluminum oxide and silicon carbide types of abrasives are available in an extensive variety of grain sizes. ranging from extra coarse to extra fine, and can be furnished in wheels. discs, sticks, rods, cylinders, tablets and blocks. The abrasives feature rubber binders which are carefully compounded with abrasive grain to achieve a resilient rubber cushion for the evenly blended abrasive. According to the manufacturer, both the aluminum oxide and silicon carbide lines are particularly ideal for removing heavy tool marks from forged aluminum. smoothing weld marks, polishing and burring stainless steel, and in many other operations on both hard and soft metals.

Brightboy Rubber-Cushioned Abrasives





Speed Lathe Has Vertical Spindle

Designated as the Type VAU3BCV. a vacuum-type speed lathe which has a vertical spindle to permit easy loading of large or heavy workpieces in the vacuum holding fixture has been announced by Schauer Mfg. Corp., 4501 Alpine Ave., Cincinnati 36, Ohio. The workpiece is readily placed into the fixture, and by closing the vacuum circuit by means of a hand valve, the part will be centered and firmly gripped. Spindle speeds range from 100 to 4,800 r.p.m. and are infinitely variable, permitting the operator to select the exact speed at which the work is most efficiently handled. The motor is coupled to the spindle through a twin disc clutch, and a large disc-type brake provides fast stopping of the spindle. The clutch and brake are controlled by a single foot treadle.

The machine can be supplied with an electrical interlock so that if the vacuum fails, the machine will auto-



Schauer Type VAU3BCV Vertical Spindle Speed Lathe

matically stop. Holding the workpiece to be finished by vacuum is said to assure a firm grip without marring or distorting.

Reduce Maintenance Costs with this

Automatic Metal Saw Grinder Wardwell's "35 T" will sharpen up to 115 saws

.015 thick at one time . . .



This includes slitting and screw slotting saws and milling cutters. Takes saws from 2" to 5½" diameter. Completely automatic. No attention is required after machine is started. These ingenious, compact and sturdy grinders are saving and making money for their owners all over the world.

You owe it to yourself to write for Bulletin 35 T containing full information.

WARDWELL

MANUFACTURING CO.

3803 Ridge Road, CLEVELAND 9, OHIO

Maker of largest line of saw and tool sharpening machines

Black Granite Layout Plate Is Lapped to Eliminate Seizure of Objects

A black granite layout plate which is lapped to eliminate seizure of gage



Collins Lapped Black Granite Layout Plate

blocks and checking fixtures is now being marketed by Collins Microflat Co., 2326 E. 8th St., Los Angeles 21, California.

The unique method of lapping is said to provide a continuous bearing surface interspersed with micronic valleys. The minute reliefs, it is claimed, afford sufficient air pocket relief between bearing surfaces to prevent seizure of instruments. The plate is lapped to a finish of 3 to 16 r.m.s., and the subdivisions of the grain pattern are so small as to be invisible to the naked eye. The layout plate is straight-sided and finished to an accuracy of 0.0002 in. per foot.

End Mill and Holder Eliminate Integral Tapered Shanks

Putnam Tool Co., 2981 Charlevoix Ave., Detroit 7, Mich., has announced an end mill and holder, designated as the "Postiv-Lok." which are said to eliminate the need for integral tapered shank end mills on large boring mill, profiling, duplicating, and similar heavy-duty applications. The end mill is available in sizes ranging upward from 11/2 in. in diameter. The accompanying illustration shows the construction of the lock. The end mill is inserted with the top flat positioned so that it will pass the locking pin. A quarter turn to the right securely locks the end mill in the holder. A

set screw on the holder is said to prevent end mill backlash.

The holder is made of selected steel, hardened to provide maximum wear and accuracy. Special adaptors for shell end mills and end mills smaller than 1½ in. in diameter are available, permitting a variety of milling



Phantom view of Putnam "Postiv-Lok" End Mill and Holder

without inserting different holders or removing work to other machines.

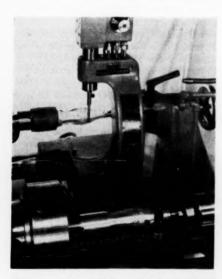
For Your Convenience ...

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 416, 418, 420 and 422.)

MODERN MACHINE SHOP

Sidney Fluid Tracer Lathe Now Available with Rotating Drive for Template

In order to further increase the versatility of its fluid tracer lathe, The Sidney Machine Tool Co., Sidney, Ohio, has announced the addition of a rotating drive for the template for use in work where radial contours, as well as axial contours, are required. The template drive consists of a 1:1 ratio between the workpiece and template.



Close-up view of Sidney 16-Inch Model 32 Tracer Lathe showing rotating drive for the template

As the stylus follows the template contour longitudinally, it will also, with the rotating template drive, reproduce whatever radial contour is incorporated in the master by transmitting these variations in contour to the cutting tool. According to the manufacturer, the addition of the rotating template drive does not in any way inhibit the use of the standard tracer control nor the convenience in converting the tracer controlled lathe to

NEW UNITED BURRING

DEBURRS • GRINDS
CONTOUR—POLISHES
INSIDE • OUTSIDE
at the Bench!

SAVES HAND FILING

Faster, cheaper, better than hand filing. United gets into corners, angles, follows curves and irregular surfaces. Works inside openings over 134".

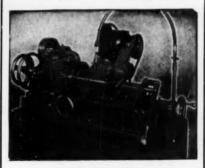
1/2 H.P. A.C. 110 V. 3450 R.P.M. 42" x 1" ABRASIVE BELT 12 OPERATING POSITIONS

F.O.B. Grand Rapids

BEST FOR TOOL AND DIE WORK, PATTERN MAKING, PRECISION FINISHING, ETC.

UNITED MACHINE TOOL CO. 1902 NELSON ST. S.E. GRAND RAPIDS 7, MICH.

WALTHAM



THREAD MILLING MACHINE

Also Pinion and Gear Cutting Machines, Cylindrical Sub-Presses, Cutter Sharpening Machines, Small Special Machinery. Cutters for thread milling and gear cutting. Write for Illustrated bulletin.

WALTHAM MACHINE WORKS

standard lathe operations without the addition or removal of parts or assemblies.

20-Ton Press Is Suitable for Many Operations

For toolroom die tryouts, "shearing in dies or punches," and large or small



Walsh Model 20X Deep Throat 20-Ton Press

production runs, Walsh Press & Die Co., Division of American Gage & Machine Co., 4709 W. Kinzie St., Chicago 44. Ill., has announced the Model 20X Deep Throat 20-Ton Press which is said to be rugged where needed and which features die forged crankshafts and ball screws. All moving parts are precision ground

or hand scraped for long life. The press is inclinable and locks in any position. The machine can be furnished by vari drive, automatic lubrication, two-button safety device and non-repeat attachment.

Grinder Features Swiveling Headstock

Designated as the Type U-4, a 12-in. universal grinding machine which has been designed to provide versatility through simplified setups and fast, precise grinding action for limited production items has been announced by Norton Co., Worcester 6, Mass. The principle feature of the machine is a swiveling headstock which has a dog drive plate on one end for conventional grinding and a 5-in. D-1 cam lock nose on the other end for mounting chucks or fixtures. To change

from a dog-drive setup to a chucking operation, it is only necessary to rotate the headstock 180 degrees and set up the work. When work is being ground on dead centers, the chuck does not rotate because the headstock is a combination live and dead center type. A work speed range of from 40 to 400 r.p.m. in an infinite number of increments is said to be available at the turn of a dial. The headstock drive is a.c. controlled through rectifiers. Quick changes from and to internal grinding is made possible by a hinged bracket internal grinding spindle which is readily lowered into position for use. It is not necessary to swivel the wheel assembly for internal grinding.

Another feature of the machine is a 11/4-in, diameter hole running clear through the headstock spindle to provide additional capacity for long shafts. The grinding wheel head itself has two swivel mountings, one for the wheel head itself to regulate the angle of the wheel with relation to the work, and the other swivel below the wheel feed mechanism to regulate the angle at which the wheel is fed into the work. Other advantages include a combination lever and handwheel operated footstock and the convenient grouping of electrical controls. Pumps and motors are mounted in accessible



View of Norton Type U-4 Universal Grinding Machine showing swiveling headstock and double swivel on wheel slide

locations; table ways are pressure lubricated; and the coolant tank has a ramped outlet to assist tank cleanout.

Throatless Shear Operates on Shop Air Pressure

A pneumatically-operated high-production throatless shear which operates on shop air pressure (60 to 100 p.s.i.) has been introduced by Beverly Shear Mfg. Co., 3000 W. 111th St., Chicago 43, Ill. According to the manufacturer, the shear is capable of making any cut (straight, curved or irregular) and has a capacity of 3/16 in. in mild steel and 10 gauge in stainless. Air operation of the shear is said to permit fast, accurate cutting of any shape in metal to the capacity of the machine. A double-acting trunnionmounted cylinder has its piston rod directly connected to the upper blade actuation arm for straight line power strokes and maximum operating efficiency. Length and speed of the shear's stroke may be adjusted by positioning the switch contact arms.

The power stroke and power return are controlled by a solenoid-operated four-way valve. The heavy-duty air cylinder has solid steel heads, caps and



Beverly Pneumatic Throatless Shear

mountings and meets J.I.C. pneumatic standards. The piston rod is hard chrome plated and the barrels are brass to ensure long life. The alloy steel shear body is designed to give maximum rigidity and strength. The blades have the correct rake to pro-



vide clean, burr-free cutting. Blades are adjustable for wear and are quickly interchangeable. The shear is fitted with a muffler to dampen noise.

Band Saw Features Non-Tilting Table

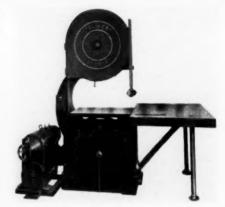
Designated as the No. 115-S, a metal cutting band saw which features a special non-tilting table having two frictionless rollers and two ball trans-



Dept. M, R.F.D. No. 1,

WADE INSTRUMENT COMPANY





Oliver No. 115-S Metal Cutting Band Saw

fers at the right of the saw has been announced by Oliver Machinery Co., Grand Rapids 2, Mich. The right-hand table of the machine measures 42 x 42 in., and the left-hand table is 18 x 36 in. The machine utilizes 38-in. diameter wheels with a 211/2-in. capacity under the guide. The saw is powered by a Reeves 5-h.p. variable-speed motor unit having a wheel speed range of from 100 to 600 r.p.m., thus providing a blade speed of approximately 1,000 to 6,000 ft. per minute.

Due to the extra-heavy table construction, the machine is said to be ideally suited for cutting heavy plates or castings. Modifications of horsepower and speeds can be made to suit individual requirements.





MICO ENGRAVERS For Metal, Plastic, Glass or Wood

For engraving nameplates, panels, machined parts or 3-dimensional reproduction of dies and molds. 4 Reduction Ratios, 1.5:1 to 4:1
Ball-bearing Spindle with Micrometer Adjustment

Send for Illustrated Catalogue

MICO INSTRUMENT COMPANY

73 Trowbridge St.

Chardon, Ohio

Cambridge 38, Mass.

Hollow Mill Utilizes Floating Holder

Carl Wirth & Son, Inc., 1625 Clinton Ave., N., Rochester 5, N. Y., has an-



Kutmore Midget Floating Holder Type Adjustable Hollow Mill

nounced the Kutmore Midget Floating Holder Type Adjustable Hollow Mill which incorporates a flange-type floating holder designed to permit easy adjustment to compensate for spindle misalignment.

The adjustable mill is available in two models; namely, the No. 104 and the No. 124. The No. 104 has a cutting capacity ranging from 0 to $\frac{1}{6}$ in. and utilizes blades measuring $\frac{1}{6}$ x 5/16 inch. The No. 124 has a cutting capacity from $\frac{1}{6}$ to $\frac{1}{4}$ in. and utilizes blades measuring $\frac{1}{6}$ x 5/16 inch. Lefthand mills can be supplied on special order.

Special Inside Micrometer Is Accurate up to 30 Feet in Length

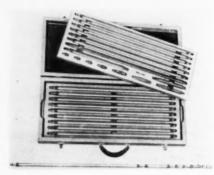
An inside micrometer which is said to be capable of high accuracies to lengths up to 30 ft. is being offered on special order by Brown & Sharpe Mfg. Co., Providence 1, R. I. The instrument has a minimum reading of 6 ft. and a maximum of 30 ft. and will measure any dimension between. Ac-



SCHERR OPTICAL TOOLS, Inc. 200-MM LAFAYETTE ST.: NEW YORK 12. N.Y.

14 - 1054

MODERN MACHINE SHOP



Brown & Sharpe Special Inside Micrometer Set

cording to the manufacturer, a special micrometer head and 25 extensions, used in combination, permit this broad coverage.

In order to minimize the inaccuracies in such long members, each extension is calibrated to the nearest ten-thousandth, permitting overall ac-

MARK and DEMAGNETIZE



The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co. P. O. BOX 132-MS TOLEDO 1, OHIO

curacy which is usually far better than that required in such large dimensions. For easy portability, the entire set is packaged in a convenient carrying case.

High Speed Steel Counterbores and Spot Facers Have Interchangeable Pilots

High speed steel counterbores and spot facers with interchangeable pilots have been added to the regular line of metal-cutting tools manufactured by Union Twist Drill Co., Athol, Mass. Four styles of standard counterbores and spot facers are available — long and short set in both straight and taper shank. Two additional styles are made especially for the aircraft industry; namely, long set and short set with ¼-in. shanks, designed for use with portable equipment, such as hand drills.

To ensure rigidity and permanent alignment, each style is made with the cutter and shank integral and with the cutting edges well backed. Pilots, it is claimed, are carefully ground from high grade alloy steel and can be supplied in two styles, one which is for the standard line and one which is designed for aircraft work.

Union High Speed Steel Counterbores and Spot Facers

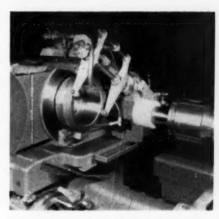


Grinding Fixture Ensures Uniform Wall Thickness and Concentricity

Bryant Chucking Grinder Co., Springfield, Vt., has announced a shoetype centerless internal grinding fixture which is said to ensure bore grinding to uniform wall thickness and concentricity held as close as 0.0001 in. or less. Roundness and straightness of the ground bore depend on the accuracy of the workpiece's outer surface and the squareness of the locating face. The fixture is available as tooling on Bryant machines.

With the fixture, straight and taper holes and plunge-ground contours can be ground. Outer surfaces can be cylindrical, conical or other surfaces of revolution as long as tolerances are held.

Thin wall rings can be shoe centerless internally ground to close tolerances as this method of supporting



Bryant Shoe-Type Centerless Internal Grinding Fixture mounted on a Bryant 1116 Machine

the work minimizes the possibility of distortion. The fixture is said to be easy to load or unload, either manually or automatically.



Commander SELECTASPINDLE

DUAL SPEED DRILL PRESS TURRET

DRILLS, REAMS, TAPS ON 1 DRILL PRESS SPINDLE!

• Fits Any Drill Press • Increases Production
• Reduces machine, fixture costs

Commander Select-A-Spindle permits you to do 3 operations on a single drill press spindle . . . save time . . . eliminate multiple handling of piece parts, speed production and reduce overall costs. Dual-Speed Select-A-Spindle permits selection of proper speed for each operation. Quick, positive hand indexing positions each tool accurately for sequence operations. Select-A-Spindle is built to tap with any 1, 2, or all 3 spindles to the full capacity of the unit. Adjustable torque control spindles for protection of taps to 1/4" available.

Write for illustrated circular on Select-A-Spindle, other Commander Production Tools and name of your nearby Commander Distributor

Commander MFG. co.

1 4224 W. KINZIE STRÄET, CHICAGO PRODUCT OF COMMANDER BUILDER OF PRODUCTION TOOLS

Machinery Mounting Pad Is Firm and Dense

Designated as the Type T "Unisorb," a machinery mounting pad for



Felters Type T "Unisorb" Mounting Pads in use

machines which must remain unusually level during operation has been announced by The Felters Co., 219 South St., Boston 11, Mass. According to the manufacturer, the pad is firm and dense and is ideal for installations of precision machines, such as light and heavy lathes, grinders, milling machines, planers and jig borers. The material is available 3/4-in. thick and

is said to carry a load of from 75 to 125 lb. per sq. inch. The material is resistant to petroleum products, mild acids and moisture conditions.

Lift Magnet Is Powered by 6-Volt Battery

Sundstrand Magnetic Products Co., Division of Sundstrand Machine Tool Co., 1020 9th St., Rockford, Ill., has introduced a lift magnet which is powered by a common 6-volt automobile battery and which is capable of lifting 2,000 lb. of mild steel. According to the manufacturer, the unit is fast and easy to operate — the operator merely has to turn a switch. There are no attached cords or wires to restrict the length of haul. The recessed control panel contains an operating switch, a dial to indicate the need of recharging and a receptacle for a trickle charger plug. A 4-amp. battery charger, which can be plugged into any 110-volt electrical outlet, is available as extra equipment for recharging a run down battery. The magnetizing surface of the unit is 7 x 121/2 inches. The unit stands 121/2 in. high and weighs 120 pounds.

Sundstrand Battery-Operated Lift Magnet



RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types and sizes. Write for it today.

*50th year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

ZEH & HAHNEMANN CO.

190 VANDERPOOL ST. NEWARK 5, N. J.

Internal Universal Gear Deburring and Chamfering Machine

A universal internal Burr-Master, designated as the BMI-14, which is designed for deburring and chamfering of internal splines, or straight sided or involute form helical or spur gears from $\frac{5}{8}$ to $\frac{31}{2}$ in. pitch diameter has been announced by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich. The machine can handle internal splines or gears hav-



Modern Burr-Master BMI-14 Internal Universal Gear Deburring and Chamfering Machine

ing from 9 to 42 teeth, depending on the tooth pitch.

The action of the machine is said to chamfer both sides of the tooth and the root at one time at the rate of five teeth per second, making it ideal for production finishing of internal splines or gears. Depth of cutting stroke is infinitely variable for maximum efficiency. Simple changeover is said to enable production to be shifted from one gear to another with minimum time loss. The only tooling com-



for complete information. *Reg. U.S. Pat. Off.

NIROL

MANUFACTURING

901 H'WAY 22, N. PLAINFIELD, N. J.

SOLD THRU LEADING SUPPLY HOUSES



GROBET CENTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

Send for catalog BC1.

GROBET FILE CO. of AMERICA, INC. 421 Canal Street N. Y. 13, N. Y. ponents that must be changed are the spline driver, work-holding fixture, toolholder and form tool, and, if the number of teeth change, the change gears.

The machine utilizes a three or four cutting edge, circular-type form tool. When one cutting edge becomes dull, it merely has to be rotated to present a sharp edge. The tool is said to be positively positioned against a stop, and no form grinding is required to sharpen tools. According to the manufacturer, conventional camming provided with the machine will accommodate most internal deburring and chamfering jobs. The machine can be furnished with special interchangeable camming if required by unusual forms of splines or gears to be finished.

A 220/440-volt ½-h.p. three-phase motor is utilized to drive the machine.

Adjustable Automatic Stock FEED STOP for DIES Dahlstrom AUTOSTOP No drill jig ... no milling. Specify whether for use on blanking, progressive or compound dies.

Milling Fixture Can Be Easily Attached to Machine

Walter W. Field & Son, 39 Hayward St., Cambridge 42, Mass., has announced the Hart Milling Fixture

which can be easily attached to the machine and which is ideal for a variety of operations on millers, shapers, drill presses and tappers. The fixture will hold round,



Hart Milling Fixture

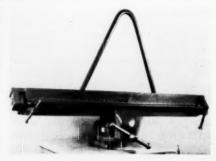
hexagonal, octagonal or square stock in any position. The unit is available in four sizes ranging from the %-in. models with a capacity of from ½ to 1½ in. to the 4-in. size with a capacity of from 2½ to 4½ inches.

Sheet Metal Brake Folds Angles, Brackets and Channels

Television Accessories Co., Dept. 19, Box 6001, Arlington 6, Va., has announced the A. B. Parker Sheet Metal Folding Machine which is said to be capable of forming angles, brackets and channels in aluminum, copper, brass and steel up to 18 gauge x 24 in. wide.

According to the manufacturer, even chassis and boxes can be formed with the machine when used with spe-

A. B. Parker Sheet Metal Folding Machine

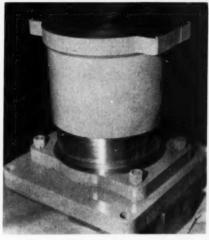


Mounts on stripper plate in 15 minutes. \$1.75 each; \$18 doz. Write for pamphlet. BRANCH MFG. CO. NORTH BRANCH, MINNIESOTA cial attachments. Portable and rugged, the brake clamps in any heavy workshop vise.

Pneumatic Die Cushion Is Fully Universal

Dayton Rogers Mfg. Co., Minneapolis 7, Minn., has announced the Model H Full Universal Pneumatic Die Cushion which is designed to develop ring holding pressures, on a 100-lb. air line, from ½ ton up to and including 45 tons. The cushion is of single cylinder design, thus providing a minimum overall height where high pressures are needed, in a limited press bed opening. A hardened and ground pin pressure pad is custom made to fit details of the press bed opening.

The die cushion is also provided with an adjustable stopping means which is said to arrest the pin pressure pad at any desired position on



Dayton Rogers Model H Pneumatic Die Cushion

the up cycle of cushion. The die cushion is available in sizes ranging from 10 to 24-in, cylinder dimension.



FORMANCE!

Modern industry demands TOP PERFORMANCE plus Economy from its production facilities. Both of these features are highly exemplified in this Standard Machine No. S. O. 4132.

Standard's 3 column hydraulic drilling, Counterboring and Taper Reaming machine is equipped with three Standard 25 H-P "DRILL-MASTERS," each column has 14-spindle head with tooling to suit successive operations. Fixtures are moved from station to station on a roller type conveyor. PART; SPROCKET. Operations: Drill, counterbore and Taper Ream Holes.

UNITED STATES SALES REPRESENTATIVES: ARNOLD J. WERNER CO., NEW CENTER BUILDING, DETROIT 2, MICHIGAN



STANDARD MACHINE AND TOOL CO., LTD. WINDSOR, ONTARIO

Test Center Can Be Used on Any Surface Plate

Inspection Devices Co., 5636M Lake Park Ave., Chicago 37, Ill., has an-



Surfcenter Universal Test Center

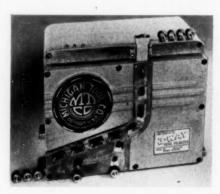
nounced a precision universal test center, designated as the Surfcenter. which can be used on any surface plate in vertical, horizontal or angular position without the need for special indicator bases or clamping on angle plates. According to the manufacturer, the center can be placed on either end and remain square to centers, and when placed on either side will remain parallel to centers. Vees are said to be held to an accuracy of 0.0002 in. for parallelism and squareness to sides and ends. Sine holes are held within 0.0001 in. and are parallel and square to sides, ends and vees. Supplied with three centers (long, short and spring loaded), the center swings a 5-in. diameter and has a maximum capacity between centers of 7 in. The unit measures 12 in. long and weighs 21 pounds.

Unit Automatically Segregates Produced Gears into Three Categories

An automatic gear selector which is designed to segregate gears produc-

ed into three categories - satisfactory, oversize and undersize, has been announced by Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. According to the manufacturer, the unit can be coupled to inspect any spur or helical gear produced on gear shaving machines, hobbing machines, gear shapers, Shear-Speed gear shapers or any other gear tooth cutting or finishing machine. The machine operator feeds gears into the selector, or gears can be inspected in a fully automatic setup without requiring any operator attention. An additional feature of the unit is that it can be furnished with an automatic shut-off, coupled with a counter, to stop the production machine if any number of conservative gears (number is optional) are rejected or the percentage of rejects on a given run exceeds set limits. Automaatic shut-off can be incorporated either into a production line with full automation or one in which the operator feeds the gears manually.

Two accurate master gears, one of



Michigan Automatic Gear Selector with part of front cover removed to show path taken by gears being inspected

which is motor driven, are used to check the gears being produced. The gears being checked are passed between the motor-driven fixed master gear and a second pivoted master gear. The pivoted gear moves in orout as required to stay in contact with the gear being checked. If the movement is within the prescribed limits, the gear rolls down an incline and is deposited in a tote pan or conveyor to be transported to the next operation. If the gear is oversize or undersize, it is diverted by the closing of a mechanically operated baffle to its proper rejected classification exit at the bottom of the selector.

Screw Driver Features Automatic Grip

Identified as the "Spee-D-Grip," a screw-holding screw driver which features tempered steel jaws that open automatically when a sleeve on the driver is pushed forward has been announced by Stanley Tools, New Britain, Conn. The driver is designed for

driving and seating screws in hard-toget-at places. After the screw has been started, a slight backward pull on the sleeve snaps the jaws free, leaving the



Stanley "Spee-D-Grip" Screw Driver

tip clear. The driver bar is forged from hexagonal steel and carefully heat treated. The tip is machine crossground to size. Four types of bars are offered, two of which have crosspoints to fit recessed head screws. Shaped for a comfortable grip, the handle is made of tough amber plastic.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

People work better when they SEE BETTER



At Western Electric's Kearny Works the MAGNI-FOCUSER is used in the mechanical laboratory for reading fine calibrations.

MAGNI-FOCUSER

SPEEDS PRODUCTION
Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

EDROY PRODUCTS CO. Dept. P. New York 17, N. Y.



Circular and Diametral Pitch Knurling. Published by Reed Rolled Thread Die Co., Worcester 1, Mass. 21 pages. Illustrated. Paper covers. Price, 75 cents.

This booklet presents general information about the knurling process and its use and briefly explains the circular and diametral pitch systems of knurling. The engineering data contained in the booklet is designed to provide a source of condensed technical information on knurling for design engineers, process engineers, and others actively engaged in the application of the knurling process. The booklet includes sections on circular pitch knurling, diametral pitch knurling, selection of knurling tools, knurling on screw machines and lathes, and knurling on thread rolling machines.

"That machine stamps them out com-

Mechanics of Materials. Third Edition. By Philip Gustave Laurson and William Junkin Cox. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 414 pages. Cloth binding, board covers. Price, \$5.75.

This book provides a clear understanding of the fundamental principles underlying machine and structural design. The Third Edition retains much of the outlook of earlier editions. At the same time, it has been largely rewritten in the interest of adding to the book's clarity and timeliness. The most important changes are the increased emphasis on the statics of stress determination and the postponement of the material on stresses determined by deformation. The chapter on combined stress has been rearranged to give increased emphasis to Mohr's Circle. Other changes are the revision of the tables of structural shapes which have been brought into conformity with present day standards; the inclusion of many new illustrations; and the addition of a whole series of new problems, many of them based on actual, well-known engineering structures.

Handy-Quik Tolerances. By Alexander Michael, Sr. Published by Handy Length Book Co., 3507 17th St., S.W., Canton, Ohio. 96 pages. Pocket size. Heavy paper covers. Price, \$1.00.

Designed for draftsmen, designers, engineers, tool and die men, steel fabricators, and so on, this booklet is divided into three parts, each part a book in itself. Part 1 contains fractional dimension tables most commonly used in industry, with decimal equivalents to three figures. Part 2 contains tables of ten thousandths decimal dimensions. Besides the decimals in size and plus and minus tolerance sizes, Part 2 also shows the closest

plete in one operation,-and I mean

complete!"

fraction. Part 3 contains a table that is entirely different and useful for precision work, as it can be used at a glance for almost any decimal tolerance.

Modern Labor Economics. By Pearce Davis and Gerald J. Matchett. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 659 pages. Cloth binding, board covers. Price, \$6.00.

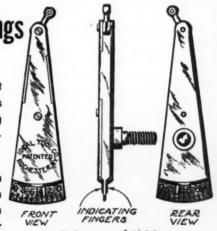
This textbook for introductory courses in labor economics and labor relations covers the entire range of labor and management objectives, issues and problems. By focusing on collective bargaining as a central theme, the many diverse facets of union-management relations are co-ordinated and integrated. Individual bargaining is fully explored as an alternative to collective bargaining. The

book clearly explains and analyzes such key subjects as growth of unions and collective bargaining, labor and management objectives and organization, collective and individual agreements, the role of government in labormanagement relations, wage structures, the economics of labor demand and supply, wage differentials, wage theory, issues of public policy, and so on. The book includes excerpts from up-to-date labor-management agreements, union constitutions, and other labor and management sources. These carefully selected documents illustrate significant points in the text and help bring the reader close to the realities of modern labor economics.

Metal Cutting Tool Handbook. Revised Edition. Published by The Metal Cutting Tool Institute, Chrysler Bldg., 405 Lexington Ave., New York 17, N.

DIAL Indicator Readings

- Accurate readings from the front or rear of an IDEAL INDICATOR is especially helpful when locating holes or where the indicator is fastened to a revolving spindle.
- IDEAL INDICATORS have been serving industry for 40 years with complete satisfaction. Prices shown include holder. Why pay more for superior service?



Price . . . \$6.00

Write for complete details.

IDEAL TOOL CO., 407 RIVER ST., ROCHESTER 12, N. Y.

Y. 689 pages. Illustrated. Cloth binding, board covers. Price, \$7.50.

This revised edition presents the latest data on twist drills, reamers, counterbores, taps, dies, milling cutters, hobs, gear shaper cutters, gear shaving cutters and broaches. In each section there is information on the design, proper application and the maintenance procedures of the tools described. This is followed by tables of dimensions and tolerances of standard sizes of tools. Engineering tables and other data commonly used in the metal-cutting industries are found in a separate section at the end of the book. Since the efficient and economical cutting of metals plays an increasingly important role in our modern industrial activities, the information contained in the handbook has been assembled with extreme care. Each section of the book has been handled by a group of specialists in that particular field.

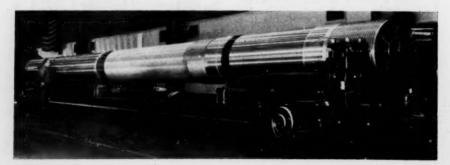
"Meet Brown & Sharpe" Film

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced the release of a motion picture entitled "Meet Brown & Sharpe." The film illustrates interesting highlights in the operations of a multiple-line precision machine tool and small tool builder. It traces the requirements in precision and in human endeavor required to build the "master tools of industry." In color and with sound, the 16mm. film is available and appropriate for civic and engineering meetings, schools, and so on. It can be obtained from any of the 13 B&S offices located in principal cities in the United States, or from the main office and plant at Providence.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

181,000-Lb. Column for 35,000-Ton Forging Press

THE illustration herewith shows a 181,000-lb. forged steel column being machined in the New Castle, Pennsylvania, plant of the United Engineering and Foundry Company. This is one of eight such columns that will be used in a 35,000-ton forging press that United is building for the United States Air Force. The column measures 60 ft. 10 in. long and is 36 in. in diameter. It has an $8\frac{1}{2}$ -in. hole bored lengthwise through its center. As depicted, it is being turned on a 72-in. engine lathe which has a 75-ft. bed.





"At Eastern Air Lines our key men in operation, maintenance, sales and management rely on

BUSINESS PUBLICATIONS

to help keep us abreast of industrial developments and business trends."

Capt. Eddie Rickenbacker Chairman of the Board and General Manager, Eastern Air Lines

In an industry beset with red ink, Eastern Air Lines has shown a profit every year since the Captain took over the controls. The fact that Captain Rickenbacker and the stalwart Eastern team of executives, engineers, pilots, traffic experts and weather wizards who back him up read their Business Publications page by page, issue by issue, is a tribute to the editing and publishing skill of this great group of periodicals.

Like Captain Rickenbacker and his associates, other business and professional leaders throughout the country are depending on the business publications which cover their own fields to bring them vital news of products, methods, markets and men. They look upon the Business Press as a superbly organized intelligence service covering dozens of specific fields. Each issue of a business publication is a special report. Because these men who influence buying read business periodicals eagerly and thoroughly, the advertising pages of the Business Press form a direct sales channel for products and services that are sold to business and professional men.



The United Business Fress

NATIONAL BUSINESS PUBLICATIONS, INC.

1001 FIFTEENTH STREET, N. W. . WASHINGTON 5, D. C. . STerling 3-7535

new literature

- 1. Magnetic Perforating Die. S. B. Whistler & Sons, Inc., 740 Military Rd., Buffalo 23, N. Y., has released a catalog describing its M12-14 10-Hole Magnetic Perforating Die.
- 2. Precision Boring Machines, Planer-Type Milling Machines, and Special Drilling, Tapping and Boring Machines are described in a bulletin issued by Simplex Machine Tool Corp., 4540 W. Mitchell St., Milwaukee 46, Wisconsin.
- 3. Automatic Gear Grinding Machines for gears, spline shafts and specially contoured parts are described in a brochure published by The Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Michigan.
- Self-Closing Knurling Tools. A size, dimension and price list of self-closing knurling tools has been released by Barnaby Mfg. Co., Inc., 74 Knowlton St., Bridgeport 8, Connecticut.
- 5. Standard Drill Jigs and Fixture Locks are described in a catalog (No. 953) published by Swartz Tool Products, Division of Jefferson Corp., 13330 Foley Ave., Detroit 27, Mich. Line drawings and specifications are included.
- 6. Turret-Type Vertical Milling Machine which features a box-type ram sliding on gibbed V-ways is fully described and illustrated in a catalog released by Trison Mfg. Co., 151 Mulberry St., Newark, New Jersey.
- 7. Internal and External Gear Lappers are described in a bulletin (No. ML-54) released by Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. Gear lapping problems and their solutions are covered.

- 8. Taps, ground from the solid, are described and illustrated in a manual released by The Charles L. Jarvis Co., Middletown, Conn. Complete specifications and line drawings are included.
- 9. Perforators which are made from non-deforming oil-hardening tool steel are described in a bulletin released by American Standard Perforators, 4878 W. Grand Ave., Chicago 39, Illinois.
- 10. Universal Heavy-Duty Saddle-Type Turret Lathes are described in a bulletin released by The Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio. Specifications and line drawings are included.
- 11. Broaching Machine. Special surfacebroaching installations of the "Ram-Press" broaching machine line are featured in a bulletin (No. RP-54) released by Colonial Broach Co., P.O. Box 37, Harper Station, Detroit 13, Michigan.
- 12. Pedestal Micrometers and Pedestal Indicators for layout, machining and inspection operations are described and illustrated in a catalog issued by Bartelt Engineering Co., 1216 Partridge Ave., Beloit, Wisconsin.
- 13. Oil Mist Control. Westinghouse Electric Corp., Sturtevant Division, Hyde Park, Boston 36, Mass., has issued a catalog (No. 1450) describing the "Precipitron," an electronic air cleaner.
- 14. Turret Lathe Center. Complete information on the "Red-E" Turret Lathe Center, as well as the complete line of bull and pipe nose type centers, is furnished in a catalog published by Ready Tool Co., 540 Iranistan Ave., Bridgeport 5, Connecticut.

USE CARD FOR FREE LITERATURE

- 15. Dial Indicators. Nilsson Gage Co., Inc., has issued a bulletin (No. 254) describing its Nilcoid Dial Indicators with pointer-line dials. Complete information on the Nilcoid movement which consists of only four moving parts is included in the bulletin.
- 16. Marking Equipment is described in a catalog released by Imperial Stamp & Engraving Co., Inc., 4458 N. Western Ave., Chicago 25, Ill. Line drawings and specifications are included.
- 17. Air Valves, Hydraulic Valves, Drill Press Feeds and Drilling and Tapping Machines are described in a catalog released by Beckett-Harcum Co., Inc., 1990 Wayne Rd., Wilmington, Ohio. Complete dimensional drawings are included.
- 18. Stampings, Washers and Specialties are described and illustrated in a catalog released by Whitehead Stamping Co., 1673 W. Lafayette Blvd., Detroit 16, Mich. Complete specifications are included in the catalog.
- 19. Cutting and Grinding Fluid Selector. D. A. Stuart Oil Co., Ltd., 2741-47 S. Troy St., Chicago 23, Ill., has released a folder which contains a Stuart's Cutting and Grinding Fluid Selector, a Stuart's Dilut-O-Graph and instructions for using each of the selectors.
- 20. Pressroom Equipment. Durant Tool Supply Co., 136 S. Water St., Providence 3, R. I., has issued a flyer sheet describing 11 leading units of its large line of pressroom equipment, including stock feeds, straighteners, choppers, oilers and reels.

- 21. Small Hole Drilling Machine. The Hamilton Tool Co., 828 S. Ninth St., Hamilton, Ohio, has published a bulletin (No. AM-54) which provides data on features and specifications of the "A-M" Super Sensitive Precision Small Hole Drilling Machine.
- 22. Square and Rectangular Gage Blocks are described and illustrated in a catalog published by Ellstrom Standards Division of Dearborn Gage Co., 22035 Beech St., Dearborn, Mich. Information on wear blocks and gage accessories is included.
- 23. Surface Grinder. A bulletin (No. 603) issued by Covel Mfg. Co., Benton Harbor, Mich., fully describes and illustrates the Covel No. 60 Precision Surface Grinder which has a 15-in. cross feed and powered elevation.
- 24. Cylindrical Grinders. Landis Tool Co., Waynesboro, Pa., has issued a booklet which describes its "job engineered" cylindrical grinders. Information on features and applications and line drawings are included.
- 25. Automatic Screw Machines, Guthery Machine Tool Corp., 130 W. 42nd St., New York 36, N. Y., has issued a bulletin describing and illustrating Traub Automatic Screw Machines.
- 26. Punch Presses. Rousselle Punch Presses which are available in deep throat, open-back inclinable and horn types are described and illustrated in a catalog published by Service Machine Co., 7627-29 S. Ashland Ave., Chicago 20, Ill. Specifications are included.

MODERN MACHINE	SHOP
----------------	------

May, 1954

(THIS CARD MUST BE USED BEFORE JULY 1, 1954)

Please send the following literature which I have encircled below:

11 12 20 21 22 23 24 25 26 35 36 37 38 39 40 41 42 50 51 52 53 54 55 56 57 58

NAME

POSITION

COMPANY

STREET_

ZONE STATE

- 27. Honing Machines, Piston Ring Lappers and Rod Borers are described and illustrated in a bulletin published by C. Allen Fulmer Co., 1233 First National Bank Bldg., Cincinnati 2, Ohio. Complete specifications are included.
- 28. Keying and Pinning Devices for Production Assembling, including machine keys, machine parts, taper pins, groove pins and Woodruff keys, are described in a catalog released by John Gillen Co., Inc., 3542 S. 50th Ave., Cicero 50, Illinois.
- 29. Bronze Bushings. Superior Brass Works, Inc., 312 S. Crawford St., Detroit 17, Mich., has issued a catalog describing and illustrating its line of highgrade bronze bearings for all purposes.
- 30. Sheet Steel Separators for fast, easy handling of steel sheets and plates are described in a bulletin (No. 1053) issued by Basco Mfg. Co., 5 Woodside St., Stamford, Conn. Specifications are included.
- 31. Counterbores and Drills. Twentieth Century Mfg. Co., Route 176 and Bradley Rd., Box 429M, Libertyville, Ill., has published a catalog describing and illustrating "Superbore" Counterbores and Drills which are available in standard, 1/64-in. oversize and 1/32-in. oversize sizes.
- 32. Power Presses. Federal Machinery Co., 136 Grand St., New York 13, N. Y., has issued a bulletin (Form 3547) describing and illustrating the line of "Press-Rite" Power Presses. Data on attachments and specifications are included in the bulletin.

- 33. Universal Backstand Idler. The Carborundum Co., Dept. MM, Niagara Falls, N. Y., has released a bulletin fully describing its "61" Universal Backstand Idler which is designed for production work, as well as intermittent jobs.
- 34. Machine Tool Spindle Bearing Manual, which outlines the fundamental principles involved in the maintenance of machine tool spindles for performing high precision work, has been issued by United Motors Service Division of General Motors Corp., GM Eldg., Detroit 2, Michigan.
- 35. Hydraulic Cylinders designed for 1,500 p.s.i. operation are described in a bulletin (No. 1500) published by Carter Controls, Inc., 2800 Bernice Rd., Lansing, Ill. Specifications and dimensional drawings are included.
- 36. Triangular Tool Bits. Weddell Tools, Inc., 37 Centennial St., Rochester 11, N. Y., has issued a catalog featuring "Tri-Bit" metal cutting tools. Data on speeds and feeds, grinding and maintenance are included.
- 37. Drill Jig Bushings which were previously listed as specials but which are now standard and carried in stock are described and illustrated in a catalog (No. 35936) release by Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Michigan.
- 38. Automatic Presses. Di Machine Corp., 2714 W. Irving Park Rd., Chicago 18, Ill., has released a bulletin (No. 21) which describes and illustrates Diebel "Di-Master" High-Production Automatic Presses

Postage Will be Paid by Addressee No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 487, Sec. 34.9, P. L. & R., Cincinnati, Ohio

MODERN MACHINE SHOP
431 MAIN STREET
CINCINNATI 2,
OHIO

AAIL THIS CARD TODAY for free literature no postage to pay!

- 39. Burring Machine for inside and outside surfaces is described and illustrated in a catalog issued by United Machine Tool Co., 1902 Nelson Ave., S.E., Grand Rapids 7, Michigan.
- 40. Vertical Drilling Machine, designated as the Model 8-18, is described in a bulletin released by The I. O. Johansson Co., 7730 Austin Ave., Skokie, Ill. Specifications are included.
- 41. Central Filtration. Industrial Filtration Co., Dept. W-294, Lebanon, Ind., has issued a folder describing a Delpark central filtration installation at Warner & Swasey's New Philadelphia, Ohio, plant.
- 42. Toolroom Accessories and Components are described and illustrated in a bulletin released by Reid Tool Supply Co., 332 Delano Ave., Muskegon Heights, Michigan.
- 43. Gear Grinding Machines. The Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich., has issued a catalog describing and illustrating its Geargrind Machines. Specifications are included.
- 44. Tap Chamfer Grinder, designed for operation in any shop where taps are used, is described in a brochure published by Edward Blake Co., 438 Cherry St., West Newton 65, Massachusetts.
- 45. "Talide Rolling Mill Work Rolls" is the title of a technical bulletin (No. TB-3) released by Metal Carbides Corp., Youngstown 7, Ohio. The difference between Grade A and Grade B rolls is covered.
- 46. Cap Screws made of heat-treated alloy steel are described and illustrated in a folder published by Standard Pressed Steel Co., Jenkintown 22, Pa.
- 47. Magnetically Driven Centrifugal Pump, designated as the Dynapump, is described in a bulletin released by The Fostoria Pressed Steel Corp., Fostoria, Ohio. Line drawings are included.
- 48. Materials Handling Equipment. Palmer-Shile Co., 16022 Fullerton Ave., Detroit 27, Mich., has issued a catalog describing its line of materials handling equipment, as well as new products.
- 49. Toolholder, available in eight models with holding ranges up to 1 in., is described in a brochure released by Brookfield, Inc., 172 Newbury St., Boston 16. Massachusetts.

- 50. Universal Collet Stop for all manual and automatic lathes is described and illustrated in a bulletin released by Knapp Industries, 107 N. Franklin St., Syracuse 2, New York.
- 51. Solenoid-Operated Production Tools, including the Electropunch, Electrostake, Electropress, and accessories, are described in a catalog issued by Black & Webster, Inc., Newton 58, Massachusetts.
- 52. "Cylinder Power in Action" is the title of a bulletin (No. 255) released by Hanna Engineering Works, 1758 Elston Ave., Chicago 22, Ill. Line drawings are included.
- 53. Alloy Tubing Steels, designated as Croloy 9M, for elevated temperature service are discussed in a technical data card (No. 151) issued by The Babcock & Wilcox Co., Tubular Products Division, Beaver Falls, Pennsylvania.
- 54. Pencil Grinder which grinds, polishes and etches is described in a catalog released by Nu-Jett Products Co., 1355 Michigan, N.E., Grand Rapids, Michigan.
- 55. Spindle Ideas for getting the most out of your present machines are included in a catalog released by The Whitnon Mfg. Co., 217 High St., New Britain, Connecticut.
- 56. Inclinable Power Presses and three models of the "Hydra-Shear" are described in a bulletin (No. 54) issued by Johnson Machine & Press Corp., 620 W. Indiana Ave., Elkhart, Indiana.
- 57. Surface Grinder. The Thompson Grinder Co., Springfield, Ohio, has released a catalog (No. B53) describing and illustrating the Type B Surface Grinder. Specifications are included.
- 58. Horizontal Shaving Machines. National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich., has released a catalog (No. S-54-2) describing Red Ring Horizontal Shaving Machines for large external gears.
- 59. Notcher. Vogel Tool & Die Corp., 1823 N. 32nd Ave., Melrose Park, Ill., has issued a catalog describing and illustrating the Twin-Notch "Arc-Fit" Pipe and Tube Notching Tool.
- 60. Motor-Spindle Drilling and Tapping Machine, designated as the Model M.S., is described and illustrated in a bulletin (No. 150) published by Edlund Machinery Co., Cortland 26, New York.

USE CARD FOR FREE LITERATURE

metalworking news in brief

Benchmaster Mfg. Co., Gardena, Calif., has announced the appointment of Lance Mosdell as plant manager. Mr. Mosdell will be in charge of plant operations and enlarging present facilities in a new plant expansion program designed to produce the company's Koil Kradle.

The Bullard Co., Bridgeport, Conn., has announced the election of Louis J. Baudis as vice president in charge of manufacturing and a director. Mr. Baudis joined the firm in 1935 as a general trainee. The company has also announced the appointment of C. Harold Anderson as chief engineer. Mr. Anderson joined the company in 1920.

- 0 -Standard Pressed Steel Co., Jenkintown, Pa., has promoted Edwin Y. Bready, Charles A. Thomas, Jr., and James L. MacDowell in the ranks of top management. Mr. Bready, formerly director of purchases, has been made division manager of the Hallowell Pressed Steel Division. Mr. Thomas, manager of industrial relations and industrial engineering, has been given company-wide charge of production control, quality control, estimating and cost analysis, in addition to his previous responsibility for industrial relations and time study. Mr. MacDowell has been advanced from manager of toolng and quality to superintendent of manufacturing of the Fastener Division.

Joseph C. Betts has been named sales representative in Michigan and Ohio by Carboloy Department of General Electric Co., Detroit, Mich. Mr. Betts will work out of Detroit. Robert M. Pozzo has also been named sales representative, working out of the Atlantic district headquarters in Newark, New Jersey. Robert Drake has joined the company as a field sales representative for the Atlantic district and is attached to the Philadelphia sales headquarters.

The Philadelphia office of Brown & Sharpe Mfg. Co., Providence, R. I., has been moved just outside of the city limits to 7 Bala Ave., Bala-Cynwyd, Pa. The new office is located in a recently completed building and continues under the direction of John J. McAleese.

F. Jerome Tone, Jr., has been named senior vice president and Frederick T. Keeler has been appointed director of sales for The Carborundum Co., Niagara Falls, N. Y. Mr. Tone, a member of the board of directors and vice president of sales since 1942, will have broad executive responsibilities, assisting and representing the president in many phases of the business. Mr. Keeler, formerly director of the marketing branch of the sales division, will be responsible for the functional direction of the sales programs of the company and its subsidiaries.

Howard M. Fitch, general manager of the Herman Nelson Division, Moline, Ill., has been elected a vice president of American Air Filter Co., Inc., Louisville, Ky. Mr. Fitch joined AAF as a sales engineer in 1936.

- o -

The Lincoln Electric Co., Cleveland, Ohio, has added three men to its field staff of application engineers for servicing industrial users of arc welding. Jack Jaso has been assigned to the Chicago district; Walter Rockway will serve the Cincinnati district; and Chester Shira will cover the Jacksonville, Florida, district.

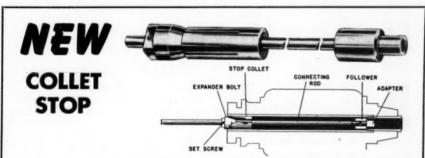
-0-

The Fairfield Gauge Co., Bridgeport, Conn., has announced the appointment of The Cleveland Instrument Co., 735 Carnegie Ave., Cleveland, Ohio, as exclusive sales agent for its Micro-Height Gage and riser. The Metal Carbides Corp., Youngstown, Ohio, has announced the appointment of Sam Ernst as a sales engineer with the Chicago office; Joseph R. Weiss, Jr., as a sales engineer with the Cincinnati office; and William Hudak as sales engineer with the Newark, New Jersey, office.

In line with new promotion and advertising plans, Cratex Mfg. Co., San Francisco, Calif., has announced the appointment of Edward R. Bate to the position of sales manager.

-0-

William D. Gross has retired as works manager at Crucible Steel Company of America's Spaulding Works, Harrison, N. J. Paul A. Karns, recently associated with John A. Roebling's Sons Corp., Trenton, N. J., as manufacturing manager, Cold Rolled Products Division, has been named to succeed Mr. Gross. Mr. Gross has been associated with Crucible since 1913.



For any size manual or automatic lathe. Accommodates pieces within 5" of entire length of headstock draw tube and collet combined. Expanding collet located in drawtube furnishes positive and immovable lock. To install: Place work piece in desired position in lathe collet and close collet. Insert stop—push connecting link of stop forward until it contacts work piece. Tighten set screw. GO TO WORK.

Send us inside diameter and length of draw tube and collet. We will send you proper size stop on 30 days free trial. Absolutely no obligation on your part but to return if you do not wish to keep it.

SALESMEN WANTED

KNAPP INDUSTRIES • 107 N. Franklin St., Syracuse 2, N. Y.

The appointment of W. Curtis Miller and Leland E. Coulter as vice presidents and V. Leonard Hanna as controller has been announced by Allied Products Corp., Detroit, Mich. Mr. Miller, who has been with Allied for eight years, the last three as general manager of Plant No. 4 in Hillsdale, Mich., will assume management of Plant No. 3, also in Hillsdale, succeeding Walter S. Smith who retired. John Gergel will

succeed Mr. Miller as general manager of Plant No. 4. Mr. Coulter will have complete charge of the RB and Hercules interchangeable punch and die activities. His headquarters will be a new plant which is under construction in Redford Township, a short distance from Detroit.

-0-

Ralph E. Cross, executive vice president of The Cross Co., Detroit, Mich., has been named technical advisor for the United States during overseas conference on control of strategic materials. The appointment of Mr. Cross to the Foreign Operations Administration is supplementary to his duties as director of the Metalworking Equipment Division, Business and Defense Administration, U. S. Department of Commerce, to which he was named early this year.

-- 0 ---

Standard Pressed Steel Co., Jenkintown, Pa., has announced the promotion of Joseph P. Villo to division manager of aircraft and allied products and Frederick D. Fernsler to manager of the Unbrako-Flexloc Division. Mr. Villo, formerly superintendent of form and finish, will be in charge of sales, sales service and shipping in the division. Mr. Fernsler, formerly manager of production control, will be responsible for sales, sales service and shipping of Unbrako socket screw products and Flexloc locknuts.

DIAMONDS

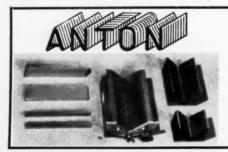
SAVE with EASTERN KNOWN FOR THEIR PRECISION AND DEPENDABILITY

 Dress your wheels accurately with long lasting Diamonds.
 Specify Holder or Nib required.
 No extra charge. Usually furnished with 7/16" x 6" Shank.

					(PRICE OMPLETE
						\$ 4.50
						7.50
			*			10.40
						14.80
						19.50
						24.00
						34.50
						52.50
	 	 	 			cc

EASTERN TOOL & SUPPLY CO.

Phone: Canal 6-3749
148 GRAND ST., NEW YORK 13, N. Y.



- MAGNETIC PARALLELS
- MAGNETIC V-BLOCKS
- MAGNETIC DIAMOND
- HOLDERS

 MAGNETIC ADJUSTABLE
- V-BLOCKS

 MAGNETIC MILLED BLANKS

ANTON MACHINE WORKS

1226 FLUSHING AVENUE . BROOKLYN 37, N. Y.

J. H. Beardsley has been elected executive vice president at the annual directors' meeting of Bryant Chucking Grinder Co., Springfield, Vt. Mr. Beardsley has been a director of Bryant since 1946. R. W. Bowlen, controller of the company, was elected a director at the annual stockholders' meeting. H. A. Bush, treasurer of Bryant, was also elected clerk of the corporation by the stockholders.

The Lincoln Electric Co., Cleveland, Ohio, has announced the appointment of Albert Patnik to the newly created position of dealer sales manager. Mr. Patnik will have the responsibility for the management of the Lincoln dealer organization, numbering some 1,000 dealers, through which Lincoln welding machines and electrodes are sold to smaller industrial users, job shops, farmers and maintenance users.

S. W. Card Mfg. Co., Division of Union Twist Drill Co., Mansfield, Mass., has announced the appointment of Jack Petruno as factory engineer at its Detroit office. Mr. Petruno has had extensive experience in the cutting tool field both in stock control and sales.

-0-

-- 0 --Clemson Bros., Inc., Middletown, N. Y., has announced the appointment of Harold W. Nelson and Hugh B. Jackson as divisional sales managers. Mr. Nelson, formerly sales manager for the Embury Mfg. Co., Warsaw, N. Y., wil supervise sales in North and South Dakota, Minnesota, Wisconsin, Illinois and part of Iowa, his headquarters being in Rochester, Minnesota. Mr. Jackson, formerly divisional sales manager for the Shirley Corp., Indianapolis, Ind., will supervise sales in the states of Iowa, Nebraska, Kansas and Missouri, with headquarters in Mission, Kansas.

Greatest Improvement in Adapter Bushings in 30 Years

Precision Grip
Adapter Bushing

LOW COST • FAST SET-UP AND TOOL GRINDING



Releases tool in bushing when set screw is released. No driving tools in or out of holders. Two flat circular springs lock bushing halves in place. No end movement or separation. Spring tension on bore to set depth of drill with gauge.

Each bushing plainly stamped for size of bore, for efficient handling and storage. Heat treated for long wear. No distortion or burning. Immediate delivery. Special sizes take four to five days.

Sales territories open.

PRECISION STEEL PRODUCTS, INC.

STOP EIGHT ROAD-ROUTE 5
DAYTON 4, OHIO

Jones & Shipman (Canada) Ltd., has announced the opening of a show room and service depot at 130 Elmslie St., Ville LaSalle, Montreal, Quebec.

William Gormley has been appointed to represent the industrial sales division of Henry Disston & Sons, Inc., Philadelphia, Pa., in a 14-county area in the northeastern part of Ohio.

-0-

Edward A. Livingstone, vice president of The Babcock & Wilcox Company, has been elected to the board of directors of the company and was also placed in charge of the company's Tubular Products Division. Mr. Livingstone takes over the position vacated by Luke E. Sawyer, who became a consultant to the company, handling special assignments in the Tubular Products Division.



Glenn D. Easton has been appointed chief engineer of Lovejoy Tool Co., Inc., Springfield, Vt. Mr. Easton succeeds E. B. Lucarini, who has retired.

The Gairing Tool Co., Detroit, Mich., has announced the election of B. O'Meara to the office of executive vice president and the appointment of William B. McClellan, formerly division manager of machine applications, as sales manager. The company has also announced the re-election of O. I. Bookle as treasurer; D. G. Hawksworth as vice president; and Julius Pochelon as secretary. Miss D. O'Neil was appointed assistant secretary.

Henry Duckworth, who was associated with Norton Co., Worcester, Mass., for more than 60 years, died recently in Palm Beach, Florida, at the age of 82 years. Mr. Duckworth retired in January, 1953, as a vice president and was the oldest Norton retiree in point of service.

Frank A. Thorn has been named supervisor of employment at Carboloy Department of General Electric Co., Detroit, Mich. Formerly supervisor of employee services, Mr. Thorn will be succeeded by Walter M. Seibel.

-0-

-0-

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has announced changes in position of company officers. Joseph M. Schaeffer. formerly a vice president and director. has been elected president. Richard L. Wilcox, former president, has been elected chairman of the board to succeed David C. Griggs, who has retired as chairman but who will continue as a director. Vice presidents re-elected were Fred S. Van Valkenburg and Irving H. Tolles. Richard C. Bannon, Cleveland office sales manager, was named a vice president. A. Dale Mitchell was elected treasurer.

Waltz Furnace Co., Cincinnati, Ohio, has announced the appointment of Charles J. Paumier, 908 S. Atlantic Blvd., Los Angeles, Calif., as West Coast representative.

-- 0 --

James R. Longwell, assistant to the general manager of Carboloy Department of General Electric Co., Detroit, Mich., has announced his retirement from the organization. Mr. Longwell has formed the Longwell Engineering-Sales Co., Birmingham, Mich., engineering and sales consultants which will also be sales representative for several manufacturers of industrial equipment.

Clemson Bros., Inc., Middletown, N. Y., has announced the retirement of R. N. Oysler after 35 years of service. Mr. Oysler had represented Clemson Brothers in the Missouri River Valley area.

-0-

-0-

Clover Mfg. Co., Norwalk, Conn., has announced the appointment of Walter R. Trezise as sales manager. Mr. Trezise was formerly associated with Behr-Manning Corporation and Armour & Company.

The Sterling Abrasives Division of The Cleveland Quarries Co., Tiffin, Ohio, has announced the appointment of James L. Goodwin as Cleveland district manager, with offices at 2333 St. Clair Avenue.

G. A. Profita has been named regional manager of the manufacturing department of the Boiler Division of The Babcock & Wilcox Company. Previously, Mr. Profita had been coordinating manufacturing and production activities at the Wilmington, North Carolina, and Brunswick, Georgia, plants.

Russell J. O'Neil has been appointed a field engineer by Norton Co., Worcester, Mass. Mr. O'Neil, who has been associated with Norton since 1945, will be assigned to the Detroit district office.

The appointment of Glenn C. Lechleitner as general manager has been announced by The Cleveland Punch & Shear Works Co., Cleveland, Ohio. Mr. Lechleitner was sales manager.

-0-

-0-

Clearing Machine Corp., Chicago, Ill., has announced a shift in territorial assignments regarding two of its sales representatives. Robert Yocum, who has represented the company in the Indianapolis territory, has been moved to Lansing, Mich., to assume charge of the company's sales office in that city. Jack Weber, who has worked out of the Chicago sales office, will be in charge of press sales in the Indianapolis territory.





One Thousandth Stop Attachment

for any turret lathe having multiple stop roll



Particularly adaptable to W & S,
 J & L and Gisholts.

Guaranteed to hold to .001 or better from face off to steps, grooves, etc. Eliminate human element of feel.

Saves time on set-ups and between shifts. Exceptionally accurate and fast on re-work. Chrome plated and case hardened for longer life.

\$29.50 F.O.B. LOS ANGELES, CALIF. Add \$10.00 for Dial Indicator if desired.

Be sure to specify make and model of your lathe or lathes.

ONE THOUSANDTH STOP CO.

P. O. BOX 2217

VAN NUYS,

CALIFORNIA

Metalworking News in Brief

M. W. Evans has been placed in charge of product development sales by The Felters Co., Boston, Mass. H. S. Lines has joined the company in a consulting and advisory capacity on the development of new products.

-0-

The appointment of Robert LePage as supervisor of the process engineering section of the abrasives laboratory has been announced by Minnesota Mining & Mfg. Co., St. Paul, Minn. In his new position, Mr. LePage will be responsible for research and development activities concerning present and potential coated abrasive manufacturing processes, as well as experimental coatings for other laboratory groups.

-- 0 --

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has announced the appointment of the following sales engineers and their headquarters: Kenneth V. Keidel, Cleveland, Ohio; Joseph H. Ondras and J. Jay Smith, Chicago, Ill.; William J. McManus and Raymond W. Arnesen, Teaneck, N. J.; Harry R. Chase and Raymond L. Moreland, Pittsburgh, Pa.; and Bruce H. Lowe and Elton W. Turner, Detroit, Michigan.

At a recent meeting of the board of director, Ex-Cell-O Corp., Detroit, Mich., appointed Edward J. Giblin to the position of assistant secretary. Mr. Giblin joined the company in 1953.

Harold E. Martin has been named division superintendent of the newly created Metal Cutting Tool Division of Brown & Sharpe Mfg. Co., Providence, R. I. In his new post, Mr. Martin will have charge of the present cutter manufacturing, hardening and engineering departments, as well as the cutter office.

"For over twelve years

the U.S. Rubber Company...'



President, United States Rubber Company



"For over twelve years the United States Rubber Company has offered its employees the Payroll Savings Plan. Over those years, tens of thousands of our employees have joined the Payroll Savings Plan with direct benefits to themselves and their families. Such employees are better employees because with more personal security and freedom from economic worry, there is less absenteeism and personnel turnover, fewer accidents and greater employee responsibility. Such regular investment in Bonds contributes also to the economic strength of the nation. By thus promoting a sounder dollar, business also directly benefits itself. That's why we at United States Rubber endorse the Payroll Savings Plan for Savings Bonds."

Mr. Humphreys cites three important benefits of the Payroll Savings Plan: Payroll Savers build personal security ... production curves reflect serious-minded workers and reduced absentee ism... the national economy is strengthened by the more than 49 billion dollars in U. S. Savings Bonds, cash value, held by individuals.

There is still another big advantage in the Payroll Savings Plan: it is easy to install and maintain.

If you do not have the Payroll Savings Plan, or if you have the Plan and your employee participation is less than 60%, here's all you have to do to help your employees, your company and the country:

Write today to Savings Bond Division, U. S. Treasury Department, Washington, D. C. Tell them you want to join the United States Rubber Company and the 45,000 other companies that are making an important contribution to national security and a sounder dollar.

Your State Director, U. S. Savings Bond Division, will contact you promptly.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

MODERN MACHINE SHOP



services directory

grinding
stamping
tool and die work
machine work
castings
heat-treating
forgings
employment
business, etc.

WHAT JOBS HAVE YOU

for



CENTRIFUGAL CASTINGS



- Improve Products
- Increase Sales! Get details request booklet!

AMERICAN NON-GRAN BRONZE CO.
Berwyn, Pa.

GRIND THE

Eastern Centerless Way

> Our new plant with increased facilities assures

PROMPT SERVICE

Eastern Centerless Grinding Co. 470 Tolland Street East Hartford 8, Conn.

CENTERLESS GRINDING AND B & S SCREW MACHINE PRODUCTS

Serving industry 23 years in producing precision ground parts. Inquiries invited.

PORTER MACHINE CO., INC. 3139 Enyert Ave., Cin'ti. 9, Ohio, ME 0313

INDUSTRIAL PRODUCTS WANTED

Well trained national sales organization, now calling on maintenance, tool room and production departments in industry can now handle additional lines. We call on well rated industrial firms. What do you have? Box No. 51, c/o MODERN MACHINE SHOP, 431 Main Street, Cincinnati 2, Ohio.

Established manufacturing firm in England with well-equipped, light engineering shop of about 100,000 sq. ft. of available floor space seeks U. S. product to manufacture under license. Firm prefers product that is precision built and, as far as possible, consumable. Write Box 52, c/o Modern Machine Shop, 431 Main St., Cincinnati 2, Ohio.

ADVERTISING RATES

for Services Directory
SENT UPON REQUEST

Write Modern Machine Shop
431 MAIN ST., CINCINNATI 2, OHIO



The Heavy Machinery Industry needs a rugged wiper. And Scott Wipers are strong. For even more strength, two can be bunched together.



The Electrical Equipment Industry needs a versatile wiper. From dusting to cleaning away grease, Scott Wipers do a perfect job.

To meet a human need...

Scott Industrial Wipers bring a new standard of safety and efficiency to Industrial Wiping

Today, all over the country, more and more companies are changing to

this entirely different wiping material, the Scott Industrial Wiper.

Scott Wipers now make wiping a scientific step in production—measurable in terms of cost, safety and efficiency.

A Scott man stands ready to demonstrate this in your plant. Simply mail this coupon or call your local Scott distributor.



Company	
Name	
SCOTT PAPER Dept. MM-G, Ch Send details on S	

where to get it

(Numbers shown are page numbers in this issue)

_ A _

Abrasive Cloth, Paper, Discs, Belts, Stones, Etc., 94, 101, 109, 218, 219, 260 Absorbents, Oil and Grease, 244 Adapters, 209, 325, 409 Air-Operated Equipment (Look for Specific Item) Angles, 276, 331

Arbors, 73, 246, 253

Broaching Machines, 8, 9, 163 Bronze Bars, 67, 299 Buffing Machines, 152, 353, 436 Burring Machines, 387 Bushings. Drill Jig, 208, 325, 368 Bushings. Guide, 11 Bushings. Pilot, 286 Bushings. Sleeve, 299, 409

__ R __

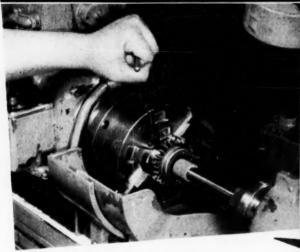
Balancing Machines, 7, 55 Balancing Ways, 294, 342 Barrels, Tumbling, 190 Bases, Machine, 210 Bases, Magnetic, 240, 352 Bearings, Bronze, 67 Bearings, Graphited, 67 Bearings, Sleeve, 67, 299 Benches, Work, 92 Bending Devices, 232 Bending Machines, 48 Bins, 333 Bits, Insert, 62, 63 Blades, Cutting-Off, 73, 268, 271 Blocks, Magnetic, 408 Blocks, Step, 306 Blocks, V, 331, 408 Bolts, 286, 312, 411 Boring Bars, 191, 253, 263 Boring, Drilling and Milling Machines, Horizontal, 157 Boring, Drilling and Tapping Machines, 32 Boring and Facing Heads, 58 Boring, Facing and Turning Machines, 157 Boring Heads, 47, 156, 263, 349 Boring Machines, Second Cover Boring Mills, Horizontal, 157 Boxes, Shop, 351 Brakes, Press and Bending, 22, 23, 155, 262 Broaches, 12, 163

Calipers, 332, 364 Cams. 306, 320, 328, 369 Carbides, 89, 328, 346 Centers, Lathe, Planer, Miller, Etc., 6, 212, 246, 323, 334, 369, 378, 395 Chaser Sharpening Machines, 61 Chasers, 61 Chisels, 379 Chucks, Air, 169 Chucks, Boring, 206 Chucks, Collet, 18, 19, 246 Chucks, Drill, 153, 349 Chucks, Internal, 203 Chucks, Lathe, 197, 345, 417 Chucks, Magnetic, 279, 363, 425 Chucks, Universal, 197 Clamp Components, 162 Clamps, 78, 162, 234, 314, 354 Clinching Machines, 249 Clutches, 267, 359 Coil Handling Equipment, 28, 76, 110, 319 Collets, 108 Comparators, 259, 365 Controlling Devices, 60, 277 Coolants, 8, 9, 77, 313 Counterbores, 13, 73, 149, 239, 421 Countersinks, 13, 73, 229, 322, 361, 395, 421 Couplings, Air, 277 Cut-Off Machines, 365, 436 Cut-Off Wheels, 68, 69 Cutter Sharpening Machines, 8, 9, 387 Cutters, Core Drill, 213 Cutters, Deburring, 229

-c-

Broaching Fixtures, 163

Buck Cuts Time-Costs-Waste!"



CUTS
TIME
30%
CUTS
COSTS
50%
CUTS
REJECTS
15% to
20%

Buck



PAT. NO. 2,639,157

CHUCKS

Only universal scroll chuck with .0005" precision — for lathes, grinders, dividing heads, screw machines.

3-jaw and 6-jaw in 4", 5", 6", 71/2", 9" sizes. 2-jaw Aviation chucks, for odd-shaped parts, in 6", 71/2", 9" sizes.

ALSO SUPER-GRIP 4-JAW IN-DEPENDENT CHUCKS FOR 9" to 16" LATHES.

on Grinders-Lathes

Globe Gear Co., Royal Oak, Mich., makes this report. They use Buck 6"-6 jaw and Buck 6"-2 jaw Ajust-Tru Chucks on the Parker-Majestic Internal Grinder, South Bend Lathe and Monarch Lathe for drilling, boring, reaming.

On work held to .0005" precision they report a 30% saving of time compared to previous methods . . . 50% cost saving per operation . . . and 15% to 20% reduction in rejects.

You too can save every time you use Buck Ajust-Tru Chucks. They adjust to dead true precision within one minute . . . guarantee .0005" precision on duplicate rechucking . . . eliminate special collets, reduce need for stub arbors, mandrels, special fixtures. No price premium for Buck chucks. Send for catalog today.

BUCK TOOL COMPANY

514 SCHIPPERS LANE . KALAMAZOO, MICH.

(Numbers shown are page numbers in this issue)

Cutters, Dovetail, 73 Cutters, Gear, 13, 170, 171 Cutters, Hole, 332 Cutters, Milling, 13, 73, 149, 200, 201, 229, 350 Cutters, Washer, 379 Cylinders, Hydraulic and Pneumatic, 117, 169. 249, 277, 291

Demagnetizers, 60 Diamond Compounds, 327 Diamond Wheels, 327 Diamonds and Diamond Tools, 327, 408 Die Heads, Threading, 61 Die Making Machines, 43 Die Sets. 40 Dies, Punching or Forming, 4, 211, 358 Dies, Threading, 265 Dividing Heads, 197, 290 Dressing Fixtures, Grinding Wheel, 78, 196, 276 Dressing Tools, 327 Drill Dispensers, 184 Drill Drifts, 246 Drill Heads, 14, 15, 47, 154, 383, 393 Drilling, Counterboring and Taper Reaming Machines, 397 Drilling Machines, Bench, 79, 85, 185, 373 Drilling Machines, Horizontal, 360 Drilling Machines, Multiple Spindle, 38, 107 Drilling Machines, Radial, 30, 31, 45, 79, 97, 112, 113, 146 Drilling Machines, Vertical, 30, 31, 79, 85, 146, 178, 179, 235, 237, 436 Drilling Units, 33 Drills, Center, Core, Twist, Square, Etc., 13, 73, 149, 246, 285, 328, 410, 421

Drills Portable Electric, 243 Duplicating Machines, 103

Dust Control Equipment, 52, 160, 431

Ejection Sets, Air, 277 End Finishers, 356 End Mills, 13, 73, 149 Engraving Machines, 390, 419 Envelopes, 390 Etchers, 348, 392

Facing Heads, 347 Facing Machines, 29

Feed Fingers, 108 Feed Units, 76, 319, 348 Feeler Stock, 280 File Cleaners, 379 Files, 175, 177, 229, 260 Files, Rotary, 14, 15, 305 Filing Machines, 234 Filters, 105, 233, 289 Flame Hardening Apparatus, 8, 9 Flexible Shaft Equipment, 14, 15, 64, 316 Forming Machines, 8, 9, 83 Furnaces, Heat-Treating, 24, 204, 282, 315, 318, 341

- G -

Gage Blanks, 290 Gage Blocks, 72, 183, 241, 337 Gage Handles, 290 Gages, 25, 72, 147, 215, 259, 277, 290, 305, 325, 367 Gaging Cartridges, 32a Gear Cutting Machines, 387 Gear Measuring Instruments and Machines, 72 Gear Shaping Machines, 170, 171 Gears and Gear Units, 73, 264 Grinders, Abrasive Band and Disc, 384 Grinders, Air, 274, 344 Grinders, Bench, 353, 374, 436 Grinders, Carbide Tool, 3 Grinders, Cutter and Tool, 43, 53, 74, 96, 237 Grinders, Cylindrical, 96 Grinders, Disc. 88 Grinders, Drill, 43, 53, 74, 115, 242 Grinders, Face, 88 Grinders, Face Mill, 43 Grinders, Internal, Second Cover, 96 Grinders, Knife, 258 Grinders, Pedestal, 353, 374, 436 Grinders, Portable Electric, 164, 199 Grinders, Profile, 8, 9 Ginders, Saw, 258, 385 Grinders, Snagging, 161 Grinders, Surface, Second Cover, 29, 53, 59, 74, 88, 96, 205, 311, 317 Grinders, Universal, 36, 37, 165 Grinding Fixtures and Attachments, 39, 145 Grinding Wheels, 93, 218, 219 Guards, Machine, 210 Guns, Air, 233, 277, 296

-H-

Hand Tools, Power (Look for Specific Item) Hardness Testing Devices, 227, 391 Hinges, 334 Hob Sharpening Machines, 200, 201 Hobbing Machines, 187, 200, 201

ENGRAVE

NAME PLATES - PANELS - DIALS



10,000 IN USE Accepted by all leading manufacturers as the speediest, most versatile portable engraver. Only the NEW HERMES has these patented features:

- Adjustable for 15 ratios.
 Self-centering holding vise.
- Automatic depth regulator.
 Adjustable copy holders.

Send for Catalog No. IM-28, describing full line of Engraving Machines including HEAVY DUTY BENCH TYPE MODEL (200 lbs.)

NEW HERMES ENGRAVING MACHINE CORP.

13-19 University Pl., New York 3, N.Y.

(Numbers shown are page numbers in this issue)

Microscopes, 367

Hobs, 13, 73, 149, 200, 201
Holders, Diamond, 408
Holders, Indicator, 240
Holders, Tap, 34, 300
Holders, Tool, 209, 213 268, 359
Honing Machines, 303
Hose, Industrial, 105
Hose Fittings, Air and Welding, 277
Hydraulic Equipment (Look for specific item)

Milled Blanks, Magnetic, 408
Milling Heads, 104
Milling Machines, Bench, 278
Milling Machines, Horizontal, 8, 9, 41, 111, 195, 207, 231
Milling Machines, Universal, 41
Milling Machines, Vertical, 114, 231, 380, 435
Mills, Hollow, 73, 377
Mills, Pipe and Tube, 83
Molds, Hammer, 302
Motors, 307
Mounted Points and Wheels, 14, 15, 357

Indexing Trunnions, 42 Indicators, 168, 401

___ J ___ lig Borers, 10, 30, 31, 79, 178, 179, 334, 347 ligs and Fixtures, 375, 389

Nails, 225 Nibblers, 320 Nuts, 306 Nuts, T, 306

- K-

Keys, Machine, 306, 361 Keys, Woodruff, 361 Keyway Cutting Machines, 236, 250, 302, 382 Knives, Band, 168 Knobs, Machine, 232, 306 Knurls, 336 Oilers, 277 Oils, Cutting, 86, 87, 167 Oils, Soluble, 49, 167

Lathes, Automatic. 7, 20, 55
Lathes, Bench. 188, 237
Lathes, Duplicating, 36, 37
Lathes, Engine and Toolroom, 16, 17, 36, 37, 45, 91, 99, 237, 295, 310, 381, Third Cover
Lathes, Speed, 152
Lathes, Turret. 7, 26, 55, 237
Layout Materials, 228, 363, 370
Light Wave Measuring Equipment, 72

Pans. Machine. 210
Pantograph. Millors. 42
Pantographs. 287
Parallels. 276, 331, 364, 408
Partitions. Wire Mesh. 431
Parts. Machine. Aircraft. Production. Etc.. 211, 361
Pins. 11, 208, 286, 306, 361
Plates. Angle. 331
Plates. Lapping. 331
Plates. Screw. 265
Plates. Surface. 276, 331
Positioning Machines. Automatic, 30, 31
Power Units. Hydraulic. 169

Lubricants, 343 Lubricators, 105, 238

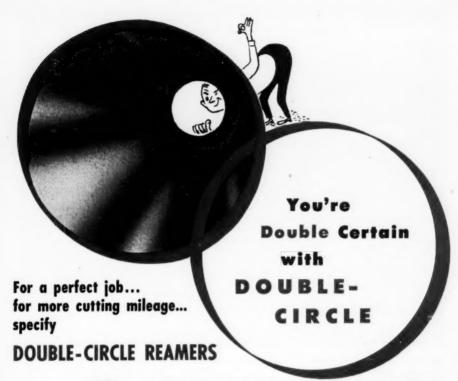
Lapping Machines, 29

Presses, Air, 169 Presses, Arbor, 102 Presses, Foot, 76

Magnifiers, 355, 376, 399
Mandrels, Expanding, 158, 266
Marking Devices, 70, 90, 214, 240, 248, 370
Metal, Expanding, 326
Metallizing Equipment, 35
Micrometers, 72, 224, 259, 304

Presses. Hydraulic. 84, 102, 169, 261 Presses. Power. 394 Presses. Punch. 28, 159, 182, 186, 261, 284, 362 Presses. Sub. 387 Pumps. Coolant and Lubricant. 82, 169, 429 Punch Press Sets. 306

Punches, 66, 211, 238, 330, 379 Punching Machines, 95 Pyrometers, 282





No standard cutting operation demands greater precision than reaming. That's why you'll always want to be certain that you choose close-tolerance reamers. We say that with Double-Circle you are "double certain."

(1) You know that Chicago-Latrobe puts into these tools the finest materials, the most precise workmanship and an unexcelled experience in close-tolerance tool making for superior micro finish.

(2) DOUBLE-CIRCLE offers a really complete line. From their vast line there will be exactly the right tool for your job. Certainly, you can use them with confidence.

FROM A CHICAGO-LATROBE DISTRIBUTOR



CHICAGO-LATROBE

W. W. OMPARIO ST. PRITCARO II.

DRILLS . REAMERS . COUNTERSINKS . COUNTERBORES . CARBIDE TOOLS . SPECIAL TOOLS

where to get it

Rules, Measuring, 224

(Numbers shown are page numbers in this issue)

- R -

Reamers, 13, 73, 149, 200, 201, 221, 229, 251, 257, 308, 335, 366, 410, 421
Rectifiers, 60
Regulators, 105, 233, 277
Riveters, Portable and Hand, 117
Riveting Machines, 249, 250
Rivets, 225
Rolling Mills, 261
Rolls, Bending, 95
Rolls, Forming, 73

-5-

Sandblast Equipment, 390 Sanders, Portable Electric, 199 Saw Blades, Band, 166, 168, 192, 226, 338 Saw Blades, Circular, 13, 281 Saw Blades, Hack, 44, 166, 168, 226, 338 Saw Frames, Hack, 166 Saw Sharpening Machines, 258, 385 Sawing Machines, Band, 100, 194, 234, 269, 340 Sawing Machines, Friction, 95, 100 Sawing Machines, Hack, 21, 197 Saws, Portable Electric, 71, 283 Screw Driving Machines, Power, 348 Screw Machines, Automatic, 65 Screws, Cap. Set. Socket and Machine, 211, 220, 225, 247, 254, 255, 312, Fourth Cover Screws, Transfer, 272, 330 Separators, Magnetic, 193, 339 Services: Milling. Grinding. Lapping. Rebuilding. Repairing. Business. Etc.. 306, 320, 328, 332, 334, 368, 414 Shapers, 22, 23, 237, 288 Shearing Machines, 22, 23, 80, 81, 95, 230 Shearing, Punching and Coping Machines, 95 Shears, Squaring, 411 Sine Bars, 78 Sleeves, 246, 253 Slitting Machines, 83 Sockets, 62, 63, 246 Special Machinery, 7, 55, 98, 261 Speed Reducers, 5 Spindles, Grinding, 98, 176, 270 Spring Coilers, 75 Spring Winders, 330 Steel, General Purpose, 423 Steel Stock, Ground Flat, 46, 168 Steel, Tool, 50, 51, 312 Stops, Feed, 396 Stops, Lathe, 407, 412 Straightedges, 276, 331 Straighteners, Stock, 196, 319 Stud Sets, 306 Stud Threader, 376 Studs, 306, 312

Superfinishing Machines, 7, 55 Swaging Machines, 32b

-T-

Tables, Elevating, 173, 189 Tables, Machine, 275 Tables, Rotary and Index, 236 Tables, Spacing, 157 Taper Attachments, 320 Tapes, Measuring, 168, 224 Tap Drivers, 56, 57 Tapping Heads, 14, 15, 27, 34, 47, 300, 383 Taps, 14, 15, 148, 217, 245, 265, 309 Thread Rollers, Automatic, 2, 336 Thread Rolls, 336 Threading Attachments, 336 Threading Machines, 387 Tool Bits, 216 Tool Blanks, 321, 371 Tool Cribs, 431 Tool Tips, 359 Tools, Balancing, 294 Tools, Boring, First Cover, 253, 263, 273, 321 Tools, Bottoming, First Cover Tools, Carbide, 13, 14, 15, 50, 51, 54, 89, 251, 324, 359, 372, 421 Tools, Deburring, 322 Tools, Internal Threading, First Cover, 248 Tools, Radius, 302 Tools, Special Cutting, 73, 98, 149, 257, 324, 421 Tools, Turning, 327 Transfer Machines, 106 Triangles, Shop, 72 Tubing, Tool Steel, 301 Turrets, Drill, 393 Turrets, Lathe, Tool Post, Bed and Tailstock.

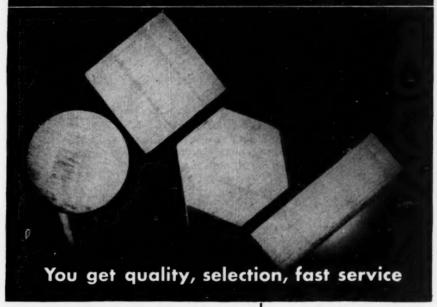
v

Valves, 82, 105, 117, 169, 277, 291 Vises, Bench and Machine, 75, 78, 197, 233, 327

_ w_

Washers, 329
Welding Equipment and Supplies, 297
Wipers, Industrial, 415
Wire Straightening Equipment, 76
Wires, Measuring, 72
Wrenches, 118, 379

WHY IT PAYS TO BUY COLD FINISHED BARS FROM US



You will save money buying your cold finished bars from U.S. Steel Supply. We carry complete stocks of all the shapes and sizes that are in common demand. All are manufactured from the world's leading quality steel—United States Steel. And we will work closely with you to select exactly the right quality for your requirements—and the right quality is not always the most expensive.

You needn't tie up money and space in large inventories of cold finished bars... we can quickly supply whatever you need. Call us for: cold finished rounds, squares, hexagons, flats and precision shafting in all grades; cold finished screw stock, Bessemer rounds, "MX" high speed screw stock.

TRIPLE SECURITY

What you want When you want it At the right price

U. S. STEEL SUPPLY



DIVISION

General Offices: 208 So. La Salle St., Chicago 4, Ill.
Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

"BABEL"

IN DE OLE CONTRE

THEY ALSO START BIG

WARS THEY CAN'T FINIS
WHY DON'T THEY GO
BACK? TH' BOATS
ARE STILL RUNNIN'

WHAT A BOM SEESTUM... NOW ALL RIGHT! NEXT!!

TOOLS

IN DE OLE CONTREE VEE NO HAVE TO LINE

OP UND VAIT FOR DE TOOLS!

OLE CONTREE

DEY KNOW VOT DEY ISS DOINK! HERE EVERYBAWDY ALL MEEXED OP UND DEY TINK VEE ISS A BONCH OF DUMBKOPFS!

CAN TH' SPEECH-MAKIN, EMIL! LET'S GO!!

MY COUNTRY,
'TIS OF
THESE!!

What's the difference between CHUCK and an ELECTRO-MAGNETIC CHUCK? hich One Should You Use?

Some swear by one, some by the other — but there's a difference, both in the way they operate and in the holding jobs each does the hest.

A Taft-Peirce Superpower Permanent Magnet Chuck has a built-in power supply of special alloy magnet material. Extremely powerful, yet controlled simply by moving a hand lever, the holding power won't fade with use.

Since a Superpower P-M Chuck has no wires to fail — no current to heat — it's the safest, most economical choice for many jobs. Portable. Versatile. It's ideal for many grinding, light milling, planing, shaping, and benchwork jobs.

A Taft-Peirce Superpower Electromagnetic Chuck gets its power from a DC line. Slightly more powerful, size for size — it throws flux farther, gives greater flux penetration to permit mounting parts well above the face plate.

In addition, it is somewhat more adaptable to unusual holding problems where complex face plate design may be required, involving such elements as special contour, grooving, or slotting.

There are, of course, applications where one does a better job than the other. Since we make them both, we're completely impartial. We'd be glad to advise you which is the best solution to your problem. Write today. (And ask for Catalogs describing the many types and models available.)



THE TAFT-PEIRCE MANUFACTURING COMPANY . WOONSOCKET, RHODE ISLAND

the last word

What Employees Want from Their Work

WE need to bring the problem of employee morale down to proper size so that we can understand the forces at work and apply the principles of our everyday administration of industrial relations, says Robert Saltonstall, Lecturer on Business Administration at the Harvard Business School, in a recent issue of the Harvard Business Review. In his article Mr. Saltonstall describes the different roles the employee plays, presents a chart of basic satisfactions employees want in these various roles, and describes how the chart can be used in a practical way. We quote:

The Employee's Roles

The first step is to bring this matter of work satisfactions down to a size we can cope with. Instead of talking about them in general, as vague terms, we need to nail them down. The clue to doing this lies in the fact that the basic satisfactions which the employee wants from his work take much of their character from the different roles he plays:

- (1) As an individual Every worker has a strong sense of individuality with a desire to express his free will and meet his own personal needs. This should never be forgotten, no matter how strong his common interests with other employees.
- (2) As a member of a work group— The industrial plant is like a small town, and its environmen has a similar influ-

ence on the individual to conform. The employee is ordinarily in close contact with other members of his department, occupation, shift, and section, who have developed their own group codes of behavior to meet their group needs, as they see them. Much of his work satisfaction is derived from the social standing awarded him by his group. . . .

- (3) As a company employee When this role is uppermost in the employee's mind, he identifies his success with the success of the company and at times subordinates his individual interests to the goals of the organization and the benefits it confers. Accordingly he is likely to view a pat on the back from his superior for extra effort put on a rush job after working hours as more rewarding at the time than anything else. . . .
- (4) As a union member—Inasmuch as over 17 million workers are now listed as active union members, we must take into account the satisfactions that an employee hopes to achieve through his union. Some of these may be termed positive satisfactions—for example, the right to vote at meetings or run for election, more money or a greater feeling of security. However, the worker also looks to his union simply for protection—from favoritism and from the arbitrary acts and decisions of management on such matters as discharge, rate setting, and technological change. The desire for com-

radeship in a common cause may weigh heavily when the employee is functioning in this role.

Quite obviously these roles lead to conflicts in feelings.... The worker who seeks rapid advancement as an individual may find that the union contract provision dealing with seniority prevents him as a union member from gaining promotion when he feels entitled to it.

But despite this fact, and despite the fact that the importance of different satisfactions to individuals varies continually depending on age, health, length of service, and a host of other factors, management has a sound basis on which good morale may be developed. This is because employees naturally react on the basis of certain common experiences. . . .

Realistic Goal

Can management ever hope to create and maintain a high level of satisfaction for all people in the company? The answer seems to be yes—provided the goal is envisaged realistically. . . The best we can hope for is to create a state of balance where the majority of employees feel their long-term satisfactions so far outweigh their temporary gripes that the prevailing feeling is "We're doing fine." . . .

Let us clearly recognize that there will be many decisions which management must make that may upset the balance of employee satisfaction. In order to keep competitive, for instance, management will undoubtedly have to introduce new machines and new methods which will temporarily create a feeling of insecurity for those affected.

At the same time, the way in which management acts in the particular instance and also the background against which it acts are important. If employees have come to trust management's good faith and accept management's objectives in employee relations, and if the change is consistent with these conceptions, employees will be likely to say, "Somehow, they will take care of us like they always have."

Needs to be Met

A continuous stream of new industrial needs and requirements serves to emphasize the great problem which American industry faces in plant modernization and in the replacement of industrial equipment now obsolete, outmoded or inadequate. In this year alone, according to latest government estimates, industry will spend \$27 billion on new plants and equipment, which is only four per cent less than last year.

According to industry's own studies, machine replacement needs are high for grinding and finishing equipment, production welding, metal forming, materials handling equipment, and so on. Couple these needs with those of new school facilities, more and better highways, new and renovated homes, modernized sections of cities, more civilian hospitals along with additional needs in such fields as electric power, farm equipment and many others and we begin to get a picture that means greater opportunity for practically every industry and practically every person in America today.

The Tool Engineer Show in Philadelphia last month presented a striking picture of the effort being made by manufacturers of metalworking tools and equipment to provide better and more productive tools, machines, and processes. It will be only when full advantage is taken of these and other new developments wherever possible that we can be assured that our industrial as well as our commercial needs will be met.

index to advertisements

(For listing of products offered by these advertisers consult Where To Get It section)

— A —	Bay State Tap & Die Co
Ace Drill Bushing368	Behr-Manning, Div. of Norton Co260
Acme Industrial Co	Bellows Co33
Acme Tool Co331	Benchmaster Mfg. Co
Acme Wire & Iron Works431	Bliss Co., E. W
Acromark Co248	Bloomfield Tool Corp320, 334
Aget-Detroit Co	Bokum Tool CoFirst Cover
Airway Pump & Equipment Co296	Boye & Emmes Machine Tool Co91
Albertson & Co., Inc243	Bradford Machine Tool Co360
Alina Corp364	Branch Mfg. Co
Allegheny Ludlum Steel Corp50, 51	Bremil Mfg. Co411
Allen Industries, Alva284	Brewster-Squires Co
Allen Mfg. Co247	Bridgeport Surface Grinding Machine Co317
Allied Products Corp211	Brighton Screw & Mfg. Co220
American Non-Gran Bronze Co,414	Brown Corp., W. R233
American Tool Works Co45	Brown Engr. Co
Ames Co., B. C	Brown & Sharpe Mfg. Co111
Anderson Bros. Mfg. Co342	Bryant Chucking Grinder Co215
Anderson Oil Co., F. E313	Bryant Mehry, & Engr. Co
Anton Machine Wks408	Buck Tool Co417
Apex Machine & Tool Co62, 63	Buffalo Forge Co38
Armstrong-Blum Mfg. Co4	Bullard Co157
Armstrong Bros. Tool Co	Bunting Brass & Bronze Co299
Atlantic Gear Works	Buol Machine Co335
Atlantic Saw Mfg. Co., Inc	Burr & Son, Inc., John T236
Atlas Press Co	Busch Co., J. C276
Auto Moulding & Mfg. Co334	
Avey Drilling Machine Co85	-c-
and bring machine co. minimum.	Carborundum Co68, 69
	Card Mfg. Co., S. W265
— B —	Carroll Dividing Head Co
	Carroll & Jamieson Machine Tool Co310
B-M-S Carbide Specialties, Inc328	Cedar-West Tool Co., Inc288
Babcock & Wilcox Co301	Cerro de Pasco Corp326
Baldor Electric Co374	Challenge Mchry. Co92
Bansbach Mchry. Co349	Chandler Tool Co58
Barber-Colman Co	Chicago-Latrobe Twist Drill Works421
Barnes Co., Inc., W. O	Chicago Mfg. & Dist. Co343
Barnes Drill Co	Chicago Wheel & Mfg. Co357
Bausch & Lomb Optical Co355	Cincinnati Bickford Tool Ce146



Illustrated is an Abbey Etna Swaging Machine, Series #154, equipped with a Ruthman Gusher Coolant Pump

All Gusher Coolant Pumps are designed to give you better performance. You get split-second control of coolant flow from the instant the machine is turned on.

Pre-lubricated heavy-duty ball bearings require no further lubrication. There is no packing or priming necessary. The electronically balanced rotating assembly reduces vibration and lengthens the life of your Gusher Coolant Pump. Always specify Gusher Coolant Pumps. Write for catalog.

THE RUTHMAN () MACHINERY CO.

1817 READING ROAD

CINCINNATI 2, OHIO

index to advertisements-

(For listing of products offered by these advertisers consult Where To Get It section)

Cincinnati Electrical Tool Co	Electro-Mechano Co
Cincinnati Lathe & Tool Co112, 113	Enco Mfg. Co298
Cincinnati Milling Machine Co	Errington Mechanical Laboratory, Inc300
Cincinnati Milling Machine Co.,	Etteo Tool Co., Inc27
Cincinnati Milling Products Div	Ex-Cell-O Corp239
Cincinnati Tool Co	
Clark Co., R. H	Fairfield Gauge Co., Inc367
Cleereman Machine Tool Co	Falls Products, Inc212
Clemson Bros., Inc	Farrel-Birmingham Co., Inc5
Cleveland Instrument Co367	Federal Products Corp25
Clipper Diamond Tool Co327	Fellows Gear Shaper Co170, 171
Colonial Property Co	Flynn Mfg. Co,
Colonial Broach Co	Foote-Burt Co107
Comet Tool Co	Fosdick Machine Tool Co
Commander Mfg. Co393	Fray Machine Tool Co
Commercial Centerless Grinder Co306	Fulflo Specialties, Co., Inc
Connecticut Broach & Machine Co12	Fuller Tool Co324
Connors & Davis Sales Corp	Fulmer Co., C. Allen303
Consolidated Machine Tool Corp	
Cell-O Corp	— G —
Cook & Chick Co	Galland-Henning Mfg. Co291
Cook, Inc., L. H302	Gammons-Hoaglund Co
Cooley Electric Mfg. Corp282	Gateo Rotary Bushing Co
Covel Mfg. Co53, 74	Gillen Co., John
Crayton, F. M411	Gisholt Machine Co
Criterion Machine Works	Gorton Machine Co., George287
Cullen Mfg. Co	Grant Mfg. & Machine Co250
Cunningham Co., M. E370	Greaves Machine Tool Co41
	Greenlee Bros. & Co
— D —	Grobet File Co. of America
Dake Engine Co	Store and the state of the stat
Danly Machine Specialties, Inc40	-H-
Davis Boring Tool Div., Giddings & Lewis Machine Tool Co253	H-K Tool Co238
Davis Keyseater Co	Hamilton Tool Co185, 187, 189
Dayton Rogers Mfg. Co	Hammond Mchry. Builders, Inc3
Dearborn Gage Co183	Hanchett Mfg. Co258
Detroit Stamping Co280, 314	Hanna Engr. Works
DeVlieg Machine Co191	Harig Mfg. Co
Di Machine Corp	Hartford Steel Ball Co
Donovan Mfg. Co	Hassall, Inc., John225
Dreis & Krump Mfg. Co	Heald Machine CoSecond Cover
Duff Machine Co380	Heimann Mfg. Co272
duMont Corp216	Heller Bros. Co. 177 Hi-Duty Drill Works 246
Durant Tool Supply Co319	Himoff Machine Co., Inc
Dykem Co228	Hirschmann Co., Carl
	Hisey-Wolf Machine Co39
-1-	Hjorth Lathe & Tool Co330
Eastern Centerless Grinding Co414	Hollow Boring Corp368
Eclipse Counterbore Co	Holo-Krome Screw CorpFourth Cover
Economy Tool & Machine Co	Howell Electric Motors Co. 397 Huot Mfg. Co. 184
Edroy Products Co	Huppert Co., K. H341
Eisler Engr. Co306	Huron Machine Products, Inc290
Electro-Matic Products Co60	Hy-Pro Tool Co217

430

STOP' DUST With **DUSTKOP**





Low cost, immediate control of dust from

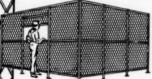
one remote dust source, or from a whole shop!

AGET-DETROIT CO. 207 Main St. Ann Arbor, Mich. 300 cfm to 10,000 cfm per unit (22 models) standard. pre-tested, available from stock.

> Ask for catalog 605-2

No obligation.

ecure Positive Protection







PARTITIONS Standard Sections Woven Wire Mesh Panels TOOL CRIBS & Doors to enclose Tool Cribs. Stock rooms and other enclosures

Immediate Delivery

Catalog available



index to advertisements

(For listing of products offered by these advertisers consult Where To Get It section)

	257 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
-1-	Mico Instrument Co
Ideal Tool Co401	Modern Machine Tool Co275
Industrial Filtration Co289	Montgomery & Co., Inc234
	Morris Machine Tool Co32
-1-	Morrison Co., D. C382
J & S Tool Co., Inc78	Morton Machine Works
Jacobs Mfg. Co	Mummert-Dixon Co347
Jarvis Co., Chas, L	— N —
Johnson & Bassett, Inc42	National Tool Co73
Johnson Bronze Co67	National Twist Drill & Tool Co
Johnson Gas Appliance Co204	
Johnson Mfg, Corp	Nelse, Karl A
Jones & Lamson Machine Co	Nelco Tool Co., Inc350
boiles & Dallison Machine Co	New Hermes419
— K —	Newcomer Products, Inc346
Kalamazoo Tank & Silo Co194	Niagara Machine & Tool Wks80, 81
Kearney & Trecker Corp	Nicholson & Co., W. H266
Kempsmith Machine Co	Nicholson File Co
Kennametal, Inc	Nielsen Tool & Die Co330
	Nilson Machine Co., A. H76
Kent Machine Co	Nirol Mfg. Co395
Kling Bros. Engr. Wks95	Noble & Westbrook Mfg. Co90
Knapp Industries407	Norgren Co., Inc., C. A
Knight Mchry, Co., W. B10	North-West Tool Co321
-1-	Northwestern Tool & Engr. Co306
	Norton Co101, 109, 218, 219
L & J Press Corp	Numberall Stamp & Tool Co214
L-W Chuck Co	Nu-Tangs, Inc332
Lamina Dies & Tools, Inc	
Landis Machine Co2	-0-
Lavallee & Ide, Inc	O.K. Tool Co286
* *** * * * * * * * * * * * * * * * * *	
LeBlond Machine Tool Co., R. K16, 17	Oliver Instrument Co43
Lehmann Boring Tool Div.,	Oliver Instrument Co.
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co.
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. .99	Oliver Instrument Co.
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188	Oliver Instrument Co.
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. 330	Oliver Instrument Co. .43 Oliver Mehry. Co. .365 Olson Industrial Products Co. .236 One Thousandth Stop Co. .412
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis .188 Lewthwaite Machine Co., T. H. .330 Libert Machine Co. .230	Oliver Instrument Co. .43 Oliver Mehry. Co. .385 Olson Industrial Products Co. .236 One Thousandth Stop Co. .412 O'Neil-Irwin Mfg. Co. .155
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. 99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. 330 Libert Machine Co. 230 Lincoln Electric Co. 297	Oliver Instrument Co. .43 Oliver Mehry. Co. .365 Olson Industrial Products Co. .236 One Thousandth Stop Co. .412 O'Nell-Irwin Mfg. Co. .155 Onsrud Machine Works .344 Ottemiller Co., Wm. H. .312
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305	Oliver Instrument Co. 43 Oliver Mchry. Co. 365 Olson Industrial Products Co. 236 One Thousandth Stop Co. 412 O'Neil-Irwin Mfg. Co. 155 Onsrud Machine Works 344 Ottemiller Co., Wm. H. 312
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. 99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. 330 Libert Machine Co. 230 Lincoln Electric Co. 297	Oliver Instrument Co
Lehmann Boring Tool Div., 273 Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .390 Linley Bros. Co. .347 Lipe-Rollway Corp. .71	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .390 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. 330 Libert Machine Co. 230 Lincoln Electric Co. 297 Lincoln Park Industries, Inc. 305 Lindberg Products Co. 390 Linley Bros. Co. 347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. 210 Lodge & Shipley Co. Third Cover	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .390 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. 330 Libert Machine Co. 230 Lincoln Electric Co. 297 Lincoln Park Industries, Inc. 305 Lindberg Products Co. 390 Linley Bros. Co. 347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. 210 Lodge & Shipley Co. Third Cover	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .390 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210 Lodge & Shipley Co. Third Cover Logansport Machine Co., Inc. .69	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co., T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210 Lodge & Shipley Co. Third Cover Logansport Machine Co. Inc. .169 Lucifer Furnaces, Inc. .318	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Novo Engine Co. .99 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .390 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210 Lodge & Shipley Co. Third Cover Logansport Machine Co. Inc. .169 Lucifer Furnaces, Inc. .318 Luers, J. Milton .268	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. .1 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .399 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210 Lodge & Shipley Co. Third Cover Logansport Machine Co., Inc. .169 Lucifer Furnaces, Inc. .318 Luers, J. Milton .268 Lufkin Rule Co. .224 Luma Electric Equipment Co. .392	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. .1 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindberg Products Co. .399 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210 Lodge & Shipley Co. Third Cover Logansport Machine Co., Inc. .169 Lucifer Furnaces, Inc. .318 Luers, J. Milton .268 Lufkin Rule Co. .224 Luma Electric Equipment Co. .392	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Novo Engine Co. .99 Lewin & Son, Inc., Louis 188 Lewin & Son, Inc., Louis 188 Lewin & Son, Inc., Louis 188 Lewin & Son, Inc., Louis 230 Libert Machine Co. 230 Lincoln Electric Co. 297 Lincoln Park Industries, Inc. 305 Linderg Products Co. 390 Linley Bros. Co. 347 Lipe-Rollway Corp. 71 Littleford Bros., Inc. 210 Lodge & Shipley Co. Third Cover Logansport Machine Co., Inc. 169 Lucffer Furnaces, Inc. 318 Luers, J. Milton 268 Lufkin Rule Co. 224 Luma Electric Equipment Co. 392 — M Madison-Kipp Corp. 274	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co. 273 Novo Engine Co. .99 Lehmann Machine Co. .99 Levin & Son, Inc., Louis 188 Lewthwaite Machine Co. T. H. .330 Libert Machine Co. .230 Lincoln Electric Co. .297 Lincoln Park Industries, Inc. .305 Lindeberg Products Co. .390 Linley Bros. Co. .347 Lipe-Rollway Corp. .71 Littleford Bros., Inc. .210 Lodge & Shipley Co. Third Cover Logansport Machine Co. Inc. .169 Lucifer Furnaces, Inc. .318 Luers, J. Milton .268 Lufkin Rule Co. .224 Luma Electric Equipment Co. .352 — Madlson-Kipp Corp. .274 Marshall Steel Co. .46	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co
Lehmann Boring Tool Div., Novo Engine Co	Oliver Instrument Co



removes metal 3 to 10 times faster! gives finishes of 20 rms and better!





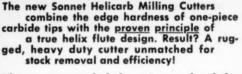
Proof of "Nelicarb" efficiency!
A 3" "Helicarb" straight shank end mill
on a 50 h.p. mill removed 61½ cubic
inches of 2340 nickel alloy steel (Rockwell C28) per minute! Spindle speed 416
r.p.m.; table speed 19" per minute;
cut depth 1-5/32".

Ask your authorized industrial distributor for prices and sizes.





Shell-End Mills



The constant included cutting angle of the "Helicarb" cutter distributes the cutting load uniformly over the full length of the cutting edge. Under proper conditions, this unique shearing cutting action reduces impact and gives 3 to 10 times greater production than possible with helical flute high speed steel, or straight tooth, carbide-tipped cutters. Uniform chip load and proper chip flow result in longer cutter and carbide life, less chatter, minimum chip recutting and smoother finishes—20 rms and better on actual production jobs!



HELICAL CARBIDE MILLING CUTTERS

Sonnet Tool and Mfg. Co., 576 No. Prairie Avenue, Hawthorne, California

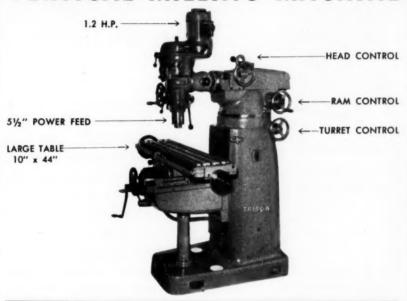
End Mills

(For listing of products offered by these advertisers consult Where To Get It section)

Donder Mont Co.	Superior Indicator Co240
Ready Tool Co	
Reed Rolled Thread Die Co336	Supreme Products, Inc
Reid Tool Supply Co232	Swartz Tool Products Co., Inc389
Richards Co., J. A232	-1-
Rivett Lathe & Grinder, Inc165	Taft-Peirce Mfg. Cc29, 425
Roberts Rubber Co., Weldon94	Tart-Peirce Mig. Cc
Rockford Clutch Div267	Tamms Industries, Inc244
Rockford Machine Tool Co103	Tannewitz Works100
Rowbottom Machine Co369	Teeter, C. B302
Rusnok Tool Works104	Thermo Electric Mfg. Co315
Ruthmann Mchry. Co429	Thompson & Son Co., H. G226
	Thriftmaster Products Corp383
—5—	Tomkins-Johnson Co249
Sanford Mfg. Corp205	Torit Mfg. Co52
Savage Co., W. J320	Torrington Co32b
Schauer Mfg. Corp	Trison Mfg. Co435
Scherr Co., Inc., George332, 337, 391	Twentieth Century Mfg. Co366
Scherr Optical Tools, Inc304	
Schmidt, Inc., Geo. T	— u —
Schrader's Son, A	Union Twist Drill Co
Scott Paper Co	United Machine Tool Co387
Scully-Jones & Co	U. S. Burke Machine Tool Div278
Seneca Falls Machine Co	U. S. Drill Head Co
Sentry Co	U. S. Steel Supply Co423
Service Machine Co	Universal Engr. Co
Services Directory414	_ v _
Severance Tool Industries, Inc229	Van Keuren Co72
Shear-Speed Chemical Products,	Verson Allsteel Press Co., Inc
Div. of Michigan Tool Co167	Vulcan Tool Co98
Sheffield Corp32a	
Sheldon Machine Co., Inc295	— W —
Sibley Machine & Foundry Corp235	Wade Instrument Co390
Sid Tool Co., Inc309	Walls Sales Corp384
Sidney Machine Tool Co79	Waltham Machine Works387
Simonds Saw & Steel Co281	Wardwell Mfg. Co385
Skil Corp199	Warner & Swasey Co
Skinner Chuck Co345	Watts Bros. Tool Works328
Somerset Tool Co276	Webber Gage Co241
Somma Tool Co371	Weldon Tool Co322
Sonnet Tool & Mfg. Co433	Wells Mfg. Corp340
South Bend Lathe Works237	Wesson Co. & Affiliates89
Speedgrip Chuck	West Point Mfg. Co354
Sperman Metal Specialties	Western Tool & Mfg. Co
Springfield Machine Tool Co36, 37	Whistler & Sons, Inc., S. B4
Stackbin Corp333	White Dental Mfg. Co., S. S
Standard Electrical Tool Co161	Whitehead Stamping Co329
Standard Gage Co., Inc	Whitney Mfg. Co., W. A
Standard Machine & Tool Co., Ltd397	Whitnon Mfg. Co270
Standard Oil Co. (Indiana)49	Willey's Carbide Tool Co
Standard Pressed Steel Co254, 255	Wilson, K. R84
Standard Steel Specialty Co286	Wilson Mechanical Instrument Co
Standard Tool Co	Winter Bros. Co
Staples Tool Co	
Starrett Co., The L. S	Wisconsin Daill Hood Co
Stebar Co	Wisconsin Drill Head Co47
Sterling Factory Equipment Co	Wittek Mfg. Co110
Strand Div., N. A., Franklin Balmar Corp64	-Y-
Sturdimatic Tool Co	·
	Yoder Co83
Sun Oil Co	-z-
Sundstrand Machine Tool Co	
Sundstrand Magnetic Products Co279	Zagar Tool, Inc
Super Tool Co251	Zeh & Hahnemann Co394

434

TRISON TURRET-TYPE VERTICAL MILLING MACHINE



This machine has a combination of features found in no other machine

REASONABLE PRICES . . . UNUSUAL FEATURES.

Immediate Delivery on Limited
Quantities Subject to
Prior Sale.

For complete details and price contact the nearest dealer or us.

EXCLUSIVE DISTRIBUTORS:

CHICAGO: Donberg & Danits, Inc. 230 North Morgan St. PHILADELPHIA: Hochman Machinery Co. 119 North 3rd St.

N. Y. and N. J.: R. Hochman & Co. 52 Edison Pl., Newark, N. J. Mitchell 3-8430

Several Good Territories Still Available to Established Machine Tool Dealers.

TRISON MANUFACTURING COMPANY

151 MULBERRY ST.

MI 3-0316

NEWARK, N. J.



THE CINCINNATI
Wet Abrasive
Cut-Off Machine





CUT-OFF TIME!

Cut any metal, solids or tubing fast and accurately! Capacity up to 2½" in solids, 3½" in tubing. Straight or angle cuts up to 45°. And look at these speeds: 2" bar stock in 15 seconds . . . 2" tubing, 3/32" wall, in 10 seconds . . . 2" angle iron, ½" thick, 45° angle, in eight seconds. Special features include Cincinati's exclusive water nozzle, insuring proper coolant flow for longer wheel life; and footoperated vise, freeing operator's hands for faster production.

Write today for Bulletin 54-VA.

MFRS. OF DRILLS, GRINDERS, BUFFERS AND PORTABLE TOOLS



Mr. and Master Mechanics

This is Dad's special day... Family Open House at Lodge & Shipley... time when he can show off to his youngster. Perhaps making lathes doesn't seem as thrilling now to the boy as being a baseball star, but Son's impressed with the "wonderful" lathes... and Dad's beaming.



11" 1 diameter

Socket Head Cap Screws are

MODER

2

MACHINE SHOP

Standard and from Stock

in all listed lengths...

 1 1/4 DIAMETER—N.C.—National Coarse Thread—Class 3 Fit Standard—7 Threads Per Inch

 Length Under Head
 2½ 3 3½ 4 4½ 5 5½ 6 6½ 7 8 9 10 12

INDIVIDUALLY PACKAGED

 1 1/2
 DIAMETER—N.C.—National Coarse Thread—Class 3 Fit Standard—6 Threads Per Inch

 Length Under Head
 3
 3½
 4
 4½
 5
 5½
 6
 6½
 7
 8
 9
 10
 12

INDIVIDUALLY PACKAGED

All Holo-Krome Distributors have well-rounded stocks and can give you prompt delivery right out of stock on all Standard Listed Sizes of Socket Screws **Because...** Holo-Krome backs them up with <u>same-day shipment</u> on any

Standard Listed Socket Screw Product*

P. S. We've been doing this far a long time now.
Yes—and when it comes to Specials—we promise to ship within 4 weeks, or better, of the day we get your order!

HOLO-KROME
Completely Cold Forged
SOCKET SCREWS

THE HOLO-KROME SCREW CORP. . HARTFORD 10, CONN., U.S.A.